STIC Search Report
EIC 1700

STIC Database Tracking Number: 193495

TO: James Lin
Location: Rem 8A28
Art Unit : 1762
June 22, 2006

Case Serial Number: 10/630887

From: Kathleen Fuller
Location: EIC 1700
REMSEN 4B28
Phone: 571/272-2505
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Search Notes

If you have any questions please give me a call or come and see me.

USPTO

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EIC17000

Questions about the scope or the results of the search? Contact *the EIC searcher or contact:*

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* [ ] *Example: 1713*
- *Relevant prior art found, search results used as follows:*

  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:

  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art not found:*
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention

Comments:

Anekwe, Imelda (ASRC) 193495

From: JAMES LIN [james.lin@uspto.gov]
Sent: Tuesday, June 20, 2006 1:35 PM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10630887

Requester:
JAMES LIN (P/1762)
Art Unit:
GROUP ART UNIT 1762
Employee Number:
82271
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Phone Number:
(571)272-8902
Mailbox Number:

Case serial number:
10630887
Class / Subclass(es):
427/100
Earliest Priority Filing Date:
8/2/02
Format preferred for results:
Paper
Search Topic Information:
The method:
Forming a piezoelectric layer between two electrodes, wherein the piezoelectric layer protudes beyond the electrodes;

depositing a coating liquid in the gap between the protuding piezoelectric layer and the substrate;

the coating liquid is a polymerizable oligomer and inorganic particles in a dispersion medium.

Examples in the spec:
polymerizable oligomer - vinyl polyer (i.e., acryl resin), epoxy resin, polyurethane, polyester, polycarbonate, and polysiloxane polymer

inorganic particles - Ti, Zr, V, Nb, Cr, Mo, W, Al, Mn, Fe, Co, Ni, and Si

dispersion medium - water, methanol, ethanol, propanol, isopropyl alcohol, butanol, and acetone

Method integrated with apparatus:
see claims 2-6

Special Instructions and Other Comments:
5/4/9 schedule with 2nd Monday off
7:30 AM - 5 PM

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=> file wpix
FILE 'WPIX' ENTERED AT 15:36:19 ON 22 JUN 2006
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FILE LAST UPDATED:            20 JUN 2006      <20060620/UP>
MOST RECENT DERWENT UPDATE:      200639         <200639/DW>
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=> d que l25
L1          1960 SEA FILE=HCAPLUS ABB=ON  PIEZOELECTR?(3A)(LAYER? OR INTERLAYER?
                )
L2            71 SEA FILE=HCAPLUS ABB=ON  L1 AND ELECTROSTRICT?
L3         98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A)(TOP OR BOTTOM OR UPPER
                OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4            21 SEA FILE=HCAPLUS ABB=ON  L2 AND L3
L5             2 SEA FILE=HCAPLUS ABB=ON  L4 AND (GAP OR PROJECT?)
L6             4 SEA FILE=HCAPLUS ABB=ON  L4 AND COAT?
L7            11 SEA FILE=HCAPLUS ABB=ON  L4 AND SUBSTRAT?
L8             2 SEA FILE=HCAPLUS ABB=ON  L4 AND (POLYMER? OR OLIGOMER? OR
                VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
                ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L9           375 SEA FILE=HCAPLUS ABB=ON  L1 AND L3
L10           26 SEA FILE=HCAPLUS ABB=ON  L9 AND (POLYMER? OR OLIGOMER? OR
                VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
                ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L11            8 SEA FILE=HCAPLUS ABB=ON  L10 AND SUBSTRAT?
L12           34 SEA FILE=HCAPLUS ABB=ON  L9 AND COAT?
L13            3 SEA FILE=HCAPLUS ABB=ON  L12 AND (GAP OR PROJECT?)
L14           16 SEA FILE=HCAPLUS ABB=ON  L12 AND SUBSTRAT?
L18           79 SEA FILE=WPIX ABB=ON  (L5 OR L6 OR L7 OR L8) OR L11 OR L13 OR
                L14
L19            2 SEA FILE=WPIX ABB=ON  L18 AND B05D?/IC
L20           54 SEA FILE=WPIX ABB=ON  L18 AND H01L?/IC
L22            5 SEA FILE=WPIX ABB=ON  L20 AND SUBSTRAT?(4A)COAT?
L23            7 SEA FILE=WPIX ABB=ON  L19 OR L22
L24            7 SEA FILE=WPIX ABB=ON  L18 AND SUBSTRAT?(4A)COAT?
L25            8 SEA FILE=WPIX ABB=ON  L23 OR L24


=> d l25 full 1-8

L25  ANSWER 1 OF 8  WPIX  COPYRIGHT 2006 THE THOMSON CORP on STN
AN   2005-649355 [66]   WPIX
DNN  N2005-531952        DNC C2005-195561
TI   Piezoelectric thin film used in piezoelectric element for ink jet system
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recording head, of perovskite crystals, with surface including crystal grains.
DC L03 P75 T04 U11 U12 V06
IN ERITATE, S; KOBAYASHI, M; KUBOTA, M; MAEDA, K; SHIMIZU, C; UCHIDA, F
PA (CANO) CANON KK; (FUJC) FUJI KAGAKU KK; (FUJC) FUJI CHEM CO LTD
CYC 109
PI WO 2005083809 A1 20050909 (200566)* EN 61 H01L041-09 <--
RW: AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IS IT KE LS LT LU MC MW MZ NA NL OA PL PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SM SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
JP 2005272294 A 20051006 (200566) 19 C04B035-49
ADT WO 2005083809 A1 WO 2005-JP3435 20050223; JP 2005272294 A JP 2005-33223 20050209
PRAI JP 2004-55479 20040227
IC ICM C04B035-49; **H01L041-09**
ICS B41J002-045; B41J002-055; B41J002-16; C01G025-00; C30B029-32; **H01L041-187; H01L041-22; H01L041-24;** H02N002-00
AB WO2005083809 A UPAB: 20051014
NOVELTY - A piezoelectric thin film (3) is of perovskite crystals with surface including crystal grains having equivalent circle diameter of at least 200 nm and those having the equivalent circle diameter of at most 40 nm. The film thickness of the piezoelectric thin film is 1,000-4,000 nm.

DETAILED DESCRIPTION - The piezoelectric thin film of perovskite crystals is a compound of formula Pb(1-x)Lax(ZryTi1-y)O3, with surface including crystal grains having equivalent circle diameter of at least 200 nm, and those having the equivalent circle diameter of at most 40 nm. The film thickness of the piezoelectric thin film is 1,000-4,000 nm. The number of crystal grains observed in the surface of the thin film and having the equivalent circle diameter of at most 40 nm is 5% with respect to the total number of crystal grains observed in the surface of the thin film. It is provided that 0 at most x at most 1, and 0.05 at most y at most 1. An INDEPENDENT CLAIM is also included for a method of manufacturing piezoelectric thin film comprising applying raw material solution containing titanium, zirconium, and lead on **substrate** to form a **coating** layer; and firing the **coating** layer at 400-700 deg. C to form **piezoelectric layer** having **layer** thickness of 150-400 nm every time the **coating** layer is formed to form the thin film.

USE - Used in piezoelectric element and piezoelectric actuator for ink jet system recording head (claimed).

ADVANTAGE - The invention provides piezoelectric thin film whose uniformity of a composition is high and whose crystal system is the same and which holds a satisfactory piezoelectric characteristics.

DESCRIPTION OF DRAWING(S) - The figure is a longitudinal section showing the piezoelectric element.

Substrate 1
Lower electrode 2
Piezoelectric thin film 3
Upper electrode 4
Arbitrary regions 5, 6
Dwg.1/10
TECH WO 2005083809 A1UPTX: 20051014
TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Properties: The crystal grains observed in the surface of the piezoelectric thin film and having

the equivalent circle diameter of greater than or equal to200 nm are columnar crystals grown from a **substrate.** A peak value of an equivalent circle diameter distribution of the crystal grains observed in the surface of the piezoelectric thin film is 50-200 nm.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Properties: The crystal grains observed in the surface of the piezoelectric thin film and having the equivalent circle diameter of greater than or equal to200 nm are columnar crystals grown from a **substrate.** A peak value of an equivalent circle diameter distribution of the crystal grains observed in the surface of the piezoelectric thin film is 50-200 nm.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Compounds: The raw material solution contains 11,8-diazabicyclo(5.4.0)-7-undecene; 1,5-diazabicyclo(4.3.0)non-5-en; or 1,4-diazabicyclo(2.2.2)octane as stabilizer.

FS CPI EPI GMPI
FA AB; GI
MC CPI: L03-G09A; L03-G10A1
EPI: T04-G02A1; U11-A02; U12-B03E; V06-M06D; V06-M11

L25 ANSWER 2 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2005-225821 [24] WPIX
CR 2004-135174 [14]
DNN N2006-315456 DNC C2006-120600
TI Piezoelectric/**electrostriction** film type component has electrodes, **substrate, piezoelectric/ electrostriction layer** having protrusion portion joined with **substrate** by material containing inorganic particle scattered in **polymer** matrix.
DC A85 L03 U12 V06
PA (NIGA) NGK INSULATORS LTD
CYC 1
PI JP 2005050830 A 20050224 (200524)* 24 H01L041-09 <--
ADT JP 2005050830 A JP 2003-193850 20030708
PRAI JP 2003-160430 20030605; US 2002-395503P 20020712
IC ICM **H01L041-09**
ICS **H01L041-083; H01L041-18; H01L041-187; H01L041-22**; H02N002-00
AB JP2005050830 A UPAB: 20060620
NOVELTY - A piezoelectric/**electrostriction** film type component (10) has **lower electrode** (77), **piezoelectric /electrostriction layer** (73), **upper electrode** (75) and ceramic **substrate** (44), in preset arrangement. The protrusion portion (79) of the **piezoelectric/ electrostriction layer** is joined with the **substrate** by specific joining material (70).
DETAILED DESCRIPTION - The piezoelectric/**electrostriction** film type component has **lower electrode**, **piezoelectric/electrostriction layer** and **upper electrode** sequentially laminated on a ceramic **substrate.** The **piezoelectric/electrostriction layer** is equipped with **piezoelectric/ electrostriction** functional portion (78) covering the upper surface and **lower** surface of **lower electrode** and **upper electrode**, respectively. The layer protrudes and is provided in the edge portion. The protrusion portion of the **piezoelectric/electrostriction layer** is joined with the **substrate** by hybrid material containing inorganic particle scatted in matrix of **polymer** compound. An INDEPENDENT

CLAIM is included for manufacture of piezoelectric/ **electrostriction** film type component, which involves sequentially laminating **lower electrode piezoelectric/ electrostriction layer** and **upper electrode** on ceramic **substrate**, applying **coating** liquid containing **polymerizable oligomer** and/or **polymerizable** monomer of inorganic particle and dispersion medium between protrusion portion of the **piezoelectric/ electrostriction layer** and **substrate** and drying the **coating** liquid to form joining material for joining the protrusion portion of the layer with the **substrate.**

USE - As piezoelectric/**electrostriction** film type element.

ADVANTAGE - The piezoelectric/**electrostriction** film type element has excellent durability, rapid responding property and high resonance frequency.

DESCRIPTION OF DRAWING(S) - The figure shows the partial cross-sectional view of the piezoelectric/**electrostriction** film type element.

piezoelectric/**electrostriction** film type element 10
substrate 44
joining material 70
piezoelectric/electrostriction layer 73
upper electrode 75
lower electrode 77
piezoelectric/**electrostriction** functional portion 78
protrusion portion 79
Dwg.1/19

TECH JP 2005050830 AUPTX: 20050422

TECHNOLOGY FOCUS - ELECTRONICS - Preferred Element: The piezoelectric/ **electrostriction** film type element has several electrodes and several **piezoelectric/electrostriction layers** alternately laminated on ceramic **substrate.** The multilayered structure of the **electrode** is arranged **between lower** and upper **piezoelectric/electrostriction layers.**

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Properties: The average particle diameter of the inorganic particle is 5 nm-1 mum. The inorganic particle has bimodal particle size distribution. The ratio of average particle diameter of large inorganic particle of particle size greater than the particle size corresponding to the point of inflexion existing between 2 points, and average particle diameter of small inorganic particle of particle size lesser than the particle size corresponding to the point of inflexion is 0.05-0.7. Preferred Liquid: The **coating** liquid contains **siloxane oligomer** and silica particle mixed with polar dispersion medium. Preferred **Oligomer**: The **siloxane oligomer** is **polymerizable** monomer or **polymerizable oligomer** of formula: RnSi(OR')4-n, where R is same as defined above, R' is methyl, ethyl, propyl, butyl, (beta)-methoxy ethoxy group, aryl, acetyl and/or substituted alkyl group, and n is 0-3. Preferred Method: The **coating** liquid is applied by spin **coat** method at a rotational speed of 1500 rpm or more.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Properties: The average particle diameter of the inorganic particle is 5 nm-1 mum. The inorganic particle has bimodal particle size distribution. The ratio of average particle diameter of large inorganic particle of particle size greater than the particle size corresponding to the point of inflexion existing between 2 points, and average particle diameter of small inorganic particle of particle size lesser than the particle size corresponding to the point of inflexion is 0.05-0.7. Preferred Liquid: The **coating**

liquid contains **siloxane oligomer** and silica particle mixed with polar dispersion medium. Preferred **Oligomer**: The **siloxane oligomer** is **polymerizable** monomer or **polymerizable oligomer** of formula: RnSi(OR')4-n, where R is same as defined above, R' is methyl, ethyl, propyl, butyl, (beta)-methoxy ethoxy group, aryl, acetyl and/or substituted alkyl group, and n is 0-3. Preferred Method: The **coating** liquid is applied by spin **coat** method at a rotational speed of 1500 rpm or more.

TECHNOLOGY FOCUS - **POLYMERS** - Preferred Material: The hybrid material contains **polysiloxane polymer** as main component. Preferred **Polymer**: The **polysiloxane polymer** is a **polymer** having substituent of formula (1).
(MK1) R=methyl, ethyl, and/or propyl, or aryl, alkenyl, (gamma)-methacryloxy propyl, (gamma)-glycidoxy propyl, (gamma)-chloropropyl, (gamma)-mercapto propyl, (gamma)-aminopropyl and/or trifluoromethyl group.

FS CPI EPI
FA AB; GI
MC CPI: L03-G10A
EPI: U12-B03E; V06-L01A; V06-L02

L25 ANSWER 3 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2004-746114 [73] WPIX
CR 2003-657526 [62]
DNN N2004-589332 DNC C2004-262183
TI Manufacture of liquid jetting head, e.g. inkjet recording head, by bonding two **substrates** with adhesive agent while forming **coating** layer comprised of resin material, and forming communicating portion.
DC L03 P75 T04 V06
IN KAMEI, H; MURAI, M
PA (SHIH) SEIKO EPSON CORP
CYC 1
PI US 2004196336 A1 20041007 (200473)* 17 B41J002-045
US 6813831 B2 20041109 (200474) B21D053-76
ADT US 2004196336 A1 Div ex US 2002-242665 20020913, US 2004-827470 20040420; US 6813831 B2 Div ex US 2002-242665 20020913, US 2004-827470 20040420
FDT US 2004196336 A1 Div ex US 6758554; US 6813831 B2 Div ex US 6758554
PRAI JP 2001-278115 20010913
IC ICM B21D053-76; B41J002-045
ICS H04R017-00
AB US2004196336 A UPAB: 20041117
NOVELTY - A liquid jetting head is manufactured by providing a first **substrate** (10) including a vibration plate and formed with a first through hole, forming piezoelectric elements (300) comprised of **upper** and **lower electrodes** (80, 60), providing a second **substrate** (30) having second through hole, bonding the second and first **substrates** with an adhesive agent (25) while forming a **coating** layer (121) comprised of a resin material, and forming a communicating portion.

DETAILED DESCRIPTION - Manufacture of a liquid jetting head comprises:

(1) providing a first **substrate**, which defines pressure generating chambers (12), the first **substrate** including a vibration plate which forms a first surface of the first **substrate**, and formed with a first through hole;

(2) forming piezoelectric elements on the vibration plate to associate with one of the pressure generating chambers, each piezoelectric element comprised of an **upper electrode**, a **lower electrode** and a **piezoelectric**

layer provided between the **upper** and **lower** **electrodes**;
(3) providing a second **substrate** formed with a second through hole;
(4) bonding the second **substrate** on the first surface of the first **substrate** with an adhesive agent, while forming a **coating** layer comprised of a resin material on an inner wall face of a region at which the first through hole and the second through hole are to be connected;and
(5) forming a communicating portion at which the first through hole and the second through hole are connected.
USE - The invention is used for the manufacture of liquid jetting head, e.g. inkjet recording head.
ADVANTAGE - The invention stabilizes ink-ejecting property to improve reliability.
DESCRIPTION OF DRAWING(S) - The figure shows an enlarged sectional view of the inkjet recording head.
First **substrate** 10
Pressure generating chambers 12
Nozzle plate 20
Adhesive agent 25
Second **substrate** 30
Upper and **lower** **electrodes** 80, 60
Coating layer 121
Piezoelectric elements 300
Dwg.3/9

TECH US 2004196336 A1UPTX: 20041112
TECHNOLOGY FOCUS - IMAGING AND COMMUNICATION - Preferred Method: The adhesive agent is extended to protrude from the inner wall face to form the **coating** layer. The communicating portion is formed by a mechanical processing, or by a laser processing. A nozzle plate (20) is bonded on a second surface of the first **substrate** opposing to the first surface, the nozzle plate formed with a plurality of nozzle orifices each communicated with one of the pressure generating chambers. The steps are performed with respect to a wafer in which first **substrates** are integrally formed.

FS CPI EPI GMPI
FA AB; GI
MC CPI: L03-D04G
EPI: T04-G02; V06-M06D; V06-M11; V06-U04B

L25 ANSWER 4 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2004-237054 [22] WPIX
DNN N2004-187828
TI Piezoelectric and **electrostrictive** film type device manufacturing method, involves forming **piezoelectric/** **electrostrictive** **layer** **beyond** **electrodes** to form **projected** portions at ends of **piezoelectric/electrostrictive** **layer.**
DC P42 P75 V06 V07
IN BESSHO, Y; MURASATO, M; OHNISHI, T; TAKAHASHI, N
PA (NIGA) NGK INSULATORS LTD
CYC 105
PI US 2004022935 A1 20040205 (200422)* 26 B05D005-12 <--
WO 2004013918 A1 20040212 (200422) JA H01L041-09
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PG PH

PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG UZ VC VN
YU ZA ZM ZW
AU 2003252300 A1 20040223 (200453) H01L041-09
ADT US 2004022935 A1 Provisional US 2002-400513P 20020802, US 2003-630887 20030730; WO 2004013918 A1 WO 2003-JP9609 20030729; AU 2003252300 A1 AU 2003-252300 20030729
FDT AU 2003252300 A1 Based on WO 2004013918
PRAI US 2002-400513P 20020802; US 2003-630887 20030730
IC ICM **B05D005-12**; H01L041-09
ICS **B05D003-02**; B41J002-045; G21H001-00; H01L041-22
AB US2004022935 A UPAB: 20040331
NOVELTY - The method involves forming a **piezoelectric/ electrostrictive layer beyond electrodes** (75,77) to form **projected** portions at its end, and **coating** a liquid prepared by admixing a **polymerizable oligomer** and inorganic particles in a dispersing medium. The **coating** liquid is dried to form a coupling unit to couple ends of a **projected** portion of the **piezoelectric/electrostrictive layer** to a **substrate** (44).

USE - Used for manufacturing a piezoelectric and **electrostrictive** film type device.

ADVANTAGE - The piezoelectric and **electrostrictive** film type device manufacturing method facilities to manufacture a piezoelectric and **electrostrictive** film type device having a high resonance frequency and increased efficiency, and efficiently facilitates to secure the conduction of each electrode.

DESCRIPTION OF DRAWING(S) - The drawing shows a partial sectional view of a piezoelectric and **electrostrictive** film type device.

Substrate 44
Thin portion 66
Fixing portion 68
Electrodes 75,77
Piezoelectric/ **electrostrictive** operation portion 78
Dwg.6/15
FS EPI GMPI
FA AB; GI
MC EPI: V06-E02; V06-J01; V07-K01B; V07-K05

L25 ANSWER 5 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2004-135174 [14] WPIX
CR 2005-225821 [24]
DNN N2004-107860 DNC C2004-053942
TI Piezoelectric/**electrostrictive** film device comprises **projecting** portion of **piezoelectric/ electrostrictive layer** coupled to **substrate** by coupling component consisting of specific hybrid material.
DC A26 A85 L03 V06
IN BESSHO, Y; KOBAYASHI, N; MURASATO, M; TAKAHASHI, N
PA (NIGA) NGK INSULATORS LTD
CYC 32
PI EP 1381093 A2 20040114 (200414)* EN 32 H01L041-09 <--
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV
MC MK NL PT RO SE SI SK TR
US 2004007947 A1 20040115 (200414) H02N002-00
ADT EP 1381093 A2 EP 2003-254404 20030711; US 2004007947 A1 Provisional US 2002-395503P 20020712, US 2003-615545 20030708
PRAI US 2002-395503P 20020712; US 2003-615545 20030708
IC ICM **H01L041-09**; H02N002-00
ICS **H01L041-04**; **H01L041-22**

AB EP 1381093 A UPAB: 20050414

NOVELTY - A piezoelectric/**electrostrictive** film device comprises a **projecting** portion of a **piezoelectric/ electrostrictive layer** being a coupling component constituted of a hybrid material in which inorganic particles are scattered in a matrix of a **polymer** compound. The **projecting** portion is coupled to a **substrate.**

DETAILED DESCRIPTION - A piezoelectric/**electrostrictive** film device comprises a **substrate** (44) formed of ceramic; and a piezoelectric/**electrostrictive** operation portion (78) including a **lower electrode** (77), **piezoelectric/ electrostrictive layer** (73) and **upper electrode** (75) which are successively stacked on the **substrate** and including a **projecting** end of the **piezoelectric/electrostrictive layer** with which an upper surface of the **lower electrode** and a **lower** surface of the **upper electrode** are **coated.** A **projecting** portion (79) of the **piezoelectric/electrostrictive layer** is a coupling component (70) comprising a hybrid material in which inorganic particles are scattered in a matrix of a **polymer** compound and is coupled to the **substrate.**

An INDEPENDENT CLAIM is also included for a manufacturing method of a piezoelectric/**electrostrictive** film device comprising **coating** an upper surface of the **lower electrode** and a **lower** surface of the **upper electrode** with the **piezoelectric/electrostrictive layer** ; **projecting** an end of the **piezoelectric/ electrostrictive layer**; applying a **coating** liquid obtained by mixing a **polymerizable oligomer** and/or a **polymerizable** monomer and inorganic particles in a dispersing medium between at least the **projecting** portion of the **piezoelectric/electrostrictive layer** and the **substrate**; drying the **coating** liquid to form a coupling component; and coupling the **projecting** portion of the **piezoelectric/electrostrictive layer** to the **substrate** by the coupling component.

USE - As a piezoelectric/**electrostrictive** film device.

ADVANTAGE - When a **projecting** portion of a **piezoelectric/electrostrictive layer** is coupled to a **substrate** by a coupling component constituted of a specific hybrid material, the piezoelectric/**electrostrictive** film device having a large resonance frequency is obtained without generating any crack in the coupling component or the **piezoelectric/electrostrictive layer.** The **piezoelectric/electrostrictive** film device of the invention has no drop in the flexural displacement. It has good durability against repeated high-speed driving.

DESCRIPTION OF DRAWING(S) - The figure shows a partial sectional view of a piezoelectric/**electrostrictive** film device of the invention.

Substrate 44
Cavity 48
Thin portion 66
Coupling component 70
Piezoelectric/electrostrictive layer 73
Upper electrode 75
Lower electrode 77
Piezoelectric/**electrostrictive** operation portion 78
Projecting portion 79

Dwg.1/19
TECH EP 1381093 A2 UPTX: 20040226
TECHNOLOGY FOCUS - **POLYMERS** - Preferred Materials: The coupling component comprises the hybrid material in which silica particles are scattered in the matrix containing a **polysiloxane polymer** as a main component. The **polysiloxane polymer** is a **polysiloxane polymer** in which a substituent group is introduced in a part shown in the formula (1). R = alkyl including methyl, ethyl, propyl, aryl, and/or alkenyl; or substituent alkyl including alpha-methacryloxypropyl, gamma-glycidoxypropyl, gamma-chloropropyl, gamma-mercaptopropyl, gamma-aminopropyl, and/or trifluoromethyl.

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Properties: An average particle diameter of the inorganic particles is 5 nm to 1 mum. The inorganic particles have a two-peak particle size distribution. A ratio (D/C) of an average particle diameter (C) of large-diameter inorganic particles having a particle diameter larger than that corresponding to an inflection point existing between two peaks to an average particle diameter (D) of small-diameter inorganic particles having a particle diameter not more than that corresponding to the inflection point is 0.05-0.7.

TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Method: Applying the **coating** liquid is performed by a spin **coating** method at at least1500 rpm.
FS CPI EPI
FA AB; GI
MC CPI: A11-B05; A12-E15; L03-D01B
EPI: V06-L01A; V06-L02; V06-M06D; V06-M11

L25 ANSWER 6 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2004-062038 [06] WPIX
DNN N2004-050266 DNC C2004-025353
TI Deposition of dense, thick piezoelectric composite **coatings** with uniform microstructure on electrode layer **coated** silicon **substrate**, comprises preparing organo-metallic sol-gel solution of lead zirconate titanate.
DC A85 L03 V01 V06
IN TAN, O K; WANG, Z; ZHAO, C; ZHU, W; CHANGLEI, Z; KIANG, T O; WEIGUANG, Z; ZHIHONG, W
PA (ACOU-N) ACOUSTICAL TECHNOLOGIES SINGAPORE PTE LT; (NTUV-N) NTU VENTURES PTE LTD; (TANO-I) TAN O K; (WANG-I) WANG Z; (ZHAO-I) ZHAO C; (ZHUW-I) ZHU W
CYC 103
PI WO 2003099741 A1 20031204 (200406)* EN 35 C04B035-624
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PH PL PT RO RU SC SD SE SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
AU 2003237766 A1 20031212 (200443) C04B035-624
SG 107103 A1 20041129 (200501) C04B035-624
AU 2003237766 A8 20031212 (200559) C04B035-624
US 2005255239 A1 20051117 (200576) B05D003-00 <--
ADT WO 2003099741 A1 WO 2003-SG116 20030516; AU 2003237766 A1 AU 2003-237766 20030516; SG 107103 A1 SG 2002-3154 20020524; AU 2003237766 A8 AU 2003-237766 20030516; US 2005255239 A1 WO 2003-SG116 20030516, US

2005-516059 20050531
FDT AU 2003237766 A1 Based on WO 2003099741; AU 2003237766 A8 Based on WO 2003099741
PRAI SG 2002-3154 20020524
IC ICM **B05D003-00**; C04B035-624
ICS **B05D005-12**; C04B035-01; C04B035-26; C04B035-468; C04B035-48; C04B035-491
AB WO2003099741 A UPAB: 20040123

NOVELTY - Dense, thick piezoelectric composite **coatings** with uniform microstructure are deposited on an electrode layer **coated** silicon **substrate** by preparing organo-metallic sol-gel solution of lead zirconate titanate with selected concentration and chemical formula.

DETAILED DESCRIPTION - Deposition of dense, thick piezoelectric composite **coatings** with uniform microstructure on an electrode layer **coated** silicon **substrate** comprises preparing organo-metallic sol-gel solution of lead zirconate titanate Pb1+y(ZrxTi1-x)O3 (PZT) with selected concentration and chemical formula; dispersing selected nano crystalline piezoelectric particles into sol-gel solution of PZT to form a uniform stable dispersion, slurry, or paste; depositing stable dispersion, slurry, or paste on electrode layer **coated** silicon wafer using spin-**coating** or screen-printing; and heating **coated** silicon wafer at temperature of at most 800 deg. C to produce dense, thick piezoelectric composite **coating** with thickness between 1-100 mu m on silicon wafer.

USE - The invention is for depositing dense, thick piezoelectric composite **coatings** with uniform microstructure on an electrode layer **coated** silicon **substrate** to produce porous bioactive implant (claimed). It is also used to produce multi-layered devices, e.g. capacitors, transformers, resonators, filters, and actuators at very low sintering temperatures.

ADVANTAGE - The invention reduces agglomeration of the nano crystalline particles, produces more homogeneously packed green body with relatively higher density, and promotes and controls the nucleation of primary crystallization to produce more homogeneous microstructure with finer size.

DESCRIPTION OF DRAWING(S) - The figure shows the production of dense nano crystalline composites.
Dwg.1/1

TECH WO 2003099741 A1UPTX: 20040123

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Component: The nano crystalline piezoelectric particles comprise PZT, lead lanthanum zirconium titanate (PLZT), lead magnesium niobate (PMN), lead zirconium niobate (PZN), barium strontium titanate (BST), lead titanate (PT), barium titanate (BT), PMN-PT, PZN-PT, or any other composition with good piezoelectric properties. The sol-gel solution is zirconium dioxide, cerium dioxide, titanium dioxide, aluminum trioxide, silicon dioxide, yttria stabilized zirconia, ceria stabilized zirconia, or bioactive materials. The nanocrystalline bioactive particles comprises hydroxyapatite and beta-calcium phosphate and other bioactive materials.
Preferred Process: The deposition of dense, thick piezoelectric composite **coatings** with uniform microstructure on an electrode layer **coated** silicon **substrate** further includes repeating steps to form multilayered structure, and providing photolithography to form a piezoelectric transducer.
Preferred Property: The porous **substrate** comprises metal foams and porous ceramics with distributed open pore size of 50-400 mum.

TECHNOLOGY FOCUS - ELECTRONICS - Preferred Component: The piezoelectric transducer comprises multilayered structure of **electrode**

top layer(s), patterned **piezoelectric**
composite **layer** (s), **bottom electrode**
layer(s), and **substrate** layer(s). The multilayered structure
comprises cantilever, bridge, and diaphragm structures. The transducer is
further arranged to form transducer array(s). It transduces ultrasound
energy from or to other forms of energy.
FS CPI EPI
FA AB; GI
MC CPI: A12-E15; L03-D01B; L03-D04D
EPI: V01-B01A; V01-B03C3A; V06-L01A; V06-L01A3; V06-M06D

L25 ANSWER 7 OF 8 WPIX COPYRIGHT 2006 THE THOMSON CORP on STN
AN 1996-040899 [05] WPIX
DNN N1996-034333 DNC C1996-013827
TI Electronic thin layer constructional unit - has improved electrode layers
of electrically conducting oxide cpds. which adheres better, electrically
conducts well and show no appearance of fatigue.
DC L03 U12 U14 V01
IN BRAND, H; JUNGK, H; KLEE, M K
PA (PHIG) PHILIPS PATENTVERWALTUNG GMBH; (PHIG) PHILIPS ELECTRONICS NV;
(PHIG) PHILIPS GLOEILAMPENFAB NV; (PHIG) US PHILIPS CORP
CYC 6
PI DE 4421007 A1 19951221 (199605)* 9 H01G004-08
EP 689249 A2 19951227 (199605) GE 12 H01L029-43 <--
R: DE FR GB NL
JP 08045781 A 19960216 (199617) 10 H01G004-33
EP 689249 A3 19970910 (199746) H01G004-08
US 5995359 A 19991130 (200003) H01G004-008
ADT DE 4421007 A1 DE 1994-4421007 19940618; EP 689249 A2 EP 1995-201577
19950614; JP 08045781 A JP 1995-151946 19950619; EP 689249 A3 EP
1995-201577 19950614; US 5995359 A CIP of US 1995-492467 19950619, US
1997-859796 19970519
PRAI DE 1994-4421007 19940618
REP No-SR.Pub; 2.Jnl.Ref; EP 495114; EP 609081; US 5164808; WO 9321637
IC ICM H01G004-008; H01G004-08; H01G004-33; **H01L029-43**
ICS C23C022-00; C23C022-82; C23C026-00
ICA H01C007-00
AB DE 4421007 A UPAB: 19960205
The electronic thin layer constructional unit comprises a
substrate, **electrode** layers for a **lower**
electrode, a **top electrode** and opt. one or
several **electrodes** in **between**, and functional layers
in **between**. The **electrode** layers contain electrically
conducting, oxide cpds.. At least one electrode layer comprises TiOx, with
1 at most x at most 2, EuOx with 1 at most x at most 2, LiTi2O4, LiV2O4,
SrVO3, ErxNbO3 with 0.65 at most x at most 0.92, RbWO3, NaxWO3,
A2P8W32O112 with A = K, Rb, Tl, NaxTayW1-yO3 with x = 0.64 and x-y = 0.18,
Na1-xSrxNbO3, LiTiO3, CeTiO3, CaVO3, La1-xSrxVO3, SrCoO3, CaRuO3, SrRuO3,
BaRuO3, BaPbO3, SrMoO3, Sr0.5La0.5O3, La4BaCu5O13-x, La2-xSrxCuO4-delta,
YBa2Cu3O7-delta, Bi2Sr2CaCu2O8+d, Bi2Sr2CuO6+d, Bi2Sr2Ca2Cu3O10+d,
Tl2Ba2CaCu2O8, TlBa2CuO6+d, Tl2Ba2Ca2Cu3O10, La4BaCu6O15, Gd1-xSrxVO3,
CaCrO3, SrFeO3, EuNbO3, SrIrO3, CaMoO3, BaMoO3, Bi3Ru3O11, VO2, CrO2,
MoO2, WO2, RhO2, PtO2, RuOx, with 1.5 at most x at most 2, IrOx, with 1.5
at most x at most 2, SnO2-d, La3Ni2O7, La3Ni3O10, M2V2O7-d with M = Tm,
Lu, M2Mo2O7 with M = Nd, Sm, Gd, Lu2Ru2O7, Pb2Ru2O7, Bi2Ru2O7, Pb2Os2O7,
Tl2Os2O7, Pb2Ir2O2, Tl2Rh2O7-d, K0.3MoO3, Rb0.3MoO3, MxV2O5 with M = Cu,
Na, Mo17O47 or Tl2O3-d or physical mixts. and/or solid solns. with each
other or up to 50 weight% of additional cpds. or metals.

Also claimed is a process for mfg. an electronic thin layer
constructional unit as above in which one or several electrode layers are

produced by **coating** a **substrate** or a functional intermediary layer with pure solns., sols. or suspensions containing starting cpds. for the electrically conducting oxide cpds. in organic solvent, using a wet chemical deposition process and then thermal treatment to form the electrically conducting oxide cpds..

USE - The constructional unit can be a discrete constructional unit or a multifunctional multicomponent system such as a non-aligned ferroelectric memory, dynamic read-write memory with selective access, integrated capacitors, thin layer actuators, thin **layer** resistances, **piezoelectric** sensors, **piezoelectric** transducers, pyroelectric sensors, electro-optical constructional units or modules with integrated passive constructional units (ICM).

ADVANTAGE - The electronic thin layer constructional unit has improved electrode layers which adhere better, electrically conduct well and show no appearance of fatigue.

Dwg.0/0

FS CPI EPI
FA AB
MC CPI: L03-A02; L03-D04D; L03-G04A; L04-C12A; L04-C14A
EPI: U12-C02X; U12-Q; U14-A03F; U14-E01A; V01-A01C; V01-A02C3A; V01-B03A; V01-B03D1A; V01-B03D1G

L25 ANSWER 8 OF 8 WPIX
AN 1995-235525 [31] WPIX
DNN N1995-183806
TI Piezoelectric bimorph element for parts feeder, relay etc. - uses through hole in metal **substrate** to embed filling material within **substrate.**
DC V03 V04 V06
PA (SUMQ) SUMITOMO METAL IND LTD
CYC 1
PI JP 07142781 A 19950602 (199531)* 5 H01L041-09 <--
ADT JP 07142781 A JP 1993-148996 19930621
PRAI JP 1993-148996 19930621
IC ICM **H01L041-09**
AB JP 07142781 A UPAB: 19950810
The bimorph element consists of two piezoelectric **substrates** (12,13) lined on either surfaces with **electrodes. Two** such **electrode coated piezoelectric substrates** are **layered** on upper and lower surfaces of a metal **substrate** (11). A through hole with smaller area compared to that of the piezoelectric **substrate,** is formed in the metal **substrate.** Via this through hole, a filling agent (14) is embedded into the metal **substrate.** The electrodes are polarized.

ADVANTAGE - Avoids increase in thickness. Raises mechanical strength. Raises efficiency by securing large amplitude change in raising sensitivity.

Dwg.1/4

FS EPI
FA AB; GI
MC EPI: V03-D05; V04-V01; V06-M06D

=> file hcapl
FILE 'HCAPLUS' ENTERED AT 15:36:47 ON 22 JUN 2006

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FILE COVERS 1907 - 22 Jun 2006  VOL 144 ISS 26
FILE LAST UPDATED: 21 Jun 2006  (20060621/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

 This file contains CAS Registry Numbers for easy and accurate
 substance identification.

=> d que l15
L1          1960 SEA FILE=HCAPLUS ABB=ON  PIEZOELECTR?(3A)(LAYER? OR INTERLAYER?
                 )
L2            71 SEA FILE=HCAPLUS ABB=ON  L1 AND ELECTROSTRICT?
L3         98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A)(TOP OR BOTTOM OR UPPER
                 OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4            21 SEA FILE=HCAPLUS ABB=ON  L2 AND L3
L5             2 SEA FILE=HCAPLUS ABB=ON  L4 AND (GAP OR PROJECT?)
L6             4 SEA FILE=HCAPLUS ABB=ON  L4 AND COAT?
L7            11 SEA FILE=HCAPLUS ABB=ON  L4 AND SUBSTRAT?
L8             2 SEA FILE=HCAPLUS ABB=ON  L4 AND (POLYMER? OR OLIGOMER? OR
                 VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
                 ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L9           375 SEA FILE=HCAPLUS ABB=ON  L1 AND L3
L10           26 SEA FILE=HCAPLUS ABB=ON  L9 AND (POLYMER? OR OLIGOMER? OR
                 VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
                 ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L11            8 SEA FILE=HCAPLUS ABB=ON  L10 AND SUBSTRAT?
L12           34 SEA FILE=HCAPLUS ABB=ON  L9 AND COAT?
L13            3 SEA FILE=HCAPLUS ABB=ON  L12 AND (GAP OR PROJECT?)
L14           16 SEA FILE=HCAPLUS ABB=ON  L12 AND SUBSTRAT?
L15           31 SEA FILE=HCAPLUS ABB=ON  (L5 OR L6 OR L7 OR L8) OR L11 OR L13
                 OR L14


=> file compendex
FILE 'COMPENDEX' ENTERED AT 15:37:03 ON 22 JUN 2006
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FILE LAST UPDATED: 19 JUN 2006       <20060619/UP>
FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

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L1          1960 SEA FILE=HCAPLUS ABB=ON  PIEZOELECTR?(3A)(LAYER? OR INTERLAYER?
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L2            71 SEA FILE=HCAPLUS ABB=ON  L1 AND ELECTROSTRICT?
L3         98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A)(TOP OR BOTTOM OR UPPER
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                    OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4             21 SEA FILE=HCAPLUS ABB=ON  L2 AND L3
L5              2 SEA FILE=HCAPLUS ABB=ON  L4 AND (GAP OR PROJECT?)
L6              4 SEA FILE=HCAPLUS ABB=ON  L4 AND COAT?
L7             11 SEA FILE=HCAPLUS ABB=ON  L4 AND SUBSTRAT?
L8              2 SEA FILE=HCAPLUS ABB=ON  L4 AND (POLYMER? OR OLIGOMER? OR
                  VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
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L9            375 SEA FILE=HCAPLUS ABB=ON  L1 AND L3
L10            26 SEA FILE=HCAPLUS ABB=ON  L9 AND (POLYMER? OR OLIGOMER? OR
                  VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
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L11             8 SEA FILE=HCAPLUS ABB=ON  L10 AND SUBSTRAT?
L12            34 SEA FILE=HCAPLUS ABB=ON  L9 AND COAT?
L13             3 SEA FILE=HCAPLUS ABB=ON  L12 AND (GAP OR PROJECT?)
L14            16 SEA FILE=HCAPLUS ABB=ON  L12 AND SUBSTRAT?
L27             0 SEA FILE=COMPENDEX ABB=ON  (L5 OR L6 OR L7 OR L8) OR L11 OR
                  L13 OR L14


=> file jicst
FILE 'JICST-EPLUS' ENTERED AT 15:37:19 ON 22 JUN 2006
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FILE COVERS 1985 TO 20 JUN 2006 (20060620/ED)

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TERM (/CT) THESAURUS RELOAD.

=> d que l26
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L2             71 SEA FILE=HCAPLUS ABB=ON  L1 AND ELECTROSTRICT?
L3          98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A)(TOP OR BOTTOM OR UPPER
                  OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4             21 SEA FILE=HCAPLUS ABB=ON  L2 AND L3
L5              2 SEA FILE=HCAPLUS ABB=ON  L4 AND (GAP OR PROJECT?)
L6              4 SEA FILE=HCAPLUS ABB=ON  L4 AND COAT?
L7             11 SEA FILE=HCAPLUS ABB=ON  L4 AND SUBSTRAT?
L8              2 SEA FILE=HCAPLUS ABB=ON  L4 AND (POLYMER? OR OLIGOMER? OR
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L10            26 SEA FILE=HCAPLUS ABB=ON  L9 AND (POLYMER? OR OLIGOMER? OR
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L12            34 SEA FILE=HCAPLUS ABB=ON  L9 AND COAT?
L13             3 SEA FILE=HCAPLUS ABB=ON  L12 AND (GAP OR PROJECT?)
L14            16 SEA FILE=HCAPLUS ABB=ON  L12 AND SUBSTRAT?
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                  L13 OR L14


=> file inspec
FILE 'INSPEC' ENTERED AT 15:37:30 ON 22 JUN 2006
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FILE LAST UPDATED: 19 JUN 2006       <20060619/UP>
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FILE COVERS 1969 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE ABSTRACT (/AB), BASIC INDEX (/BI) AND TITLE (/TI) FIELDS  >>>

<<< INSPEC HAS BEEN RELOADED AND ENHANCED --> SEE NEWS
    AND HELP CHANGE  >>>

=> d que l28
L1          1960 SEA FILE=HCAPLUS ABB=ON  PIEZOELECTR?(3A)(LAYER? OR INTERLAYER?
                 )
L2            71 SEA FILE=HCAPLUS ABB=ON  L1 AND ELECTROSTRICT?
L3         98700 SEA FILE=HCAPLUS ABB=ON  ELECTRODE?(3A)(TOP OR BOTTOM OR UPPER
                 OR LOWER OR BETWEEN OR TWO OR 2 OR STACK? OR BEYOND)
L4            21 SEA FILE=HCAPLUS ABB=ON  L2 AND L3
L5             2 SEA FILE=HCAPLUS ABB=ON  L4 AND (GAP OR PROJECT?)
L6             4 SEA FILE=HCAPLUS ABB=ON  L4 AND COAT?
L7            11 SEA FILE=HCAPLUS ABB=ON  L4 AND SUBSTRAT?
L8             2 SEA FILE=HCAPLUS ABB=ON  L4 AND (POLYMER? OR OLIGOMER? OR
                 VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
                 ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L9           375 SEA FILE=HCAPLUS ABB=ON  L1 AND L3
L10           26 SEA FILE=HCAPLUS ABB=ON  L9 AND (POLYMER? OR OLIGOMER? OR
                 VINYL? OR EPOX? OR POLYURETHANE? OR POLYESTER? OR POLYCARBONATE
                 ? OR POLYSILOXANE? OR SILOXANE? OR URETHANE?)
L11            8 SEA FILE=HCAPLUS ABB=ON  L10 AND SUBSTRAT?
L12           34 SEA FILE=HCAPLUS ABB=ON  L9 AND COAT?
L13            3 SEA FILE=HCAPLUS ABB=ON  L12 AND (GAP OR PROJECT?)
L14           16 SEA FILE=HCAPLUS ABB=ON  L12 AND SUBSTRAT?
L28            5 SEA FILE=INSPEC ABB=ON  (L5 OR L6 OR L7 OR L8) OR L11 OR L13
                 OR L14


=> dup rem l15 l26 l28
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PROCESSING COMPLETED FOR L15
PROCESSING COMPLETED FOR L26
PROCESSING COMPLETED FOR L28
L29           37 DUP REM L15 L26 L28 (0 DUPLICATES REMOVED)

=> d l29 all 1-37

L29  ANSWER 1 OF 37  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN   2005:15707  HCAPLUS
DN   142:105391
ED   Entered STN:  07 Jan 2005
TI   Method of manufacturing film bulk acoustic resonator using internal stress
     of metallic film and resonator manufactured thereby
IN   Kim, Jong-Seok; Choa, SungHoon; Song, In-Sang; Hong, Young-Tack
PA   Samsung Electronics Co., Ltd., S. Korea
```

SO U.S. Pat. Appl. Publ., 10 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01L021-00
ICS H01L027-14; H01L029-82
INCL 257414000; 438048000; 438052000; 257416000
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 48
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2005001274	A1	20050106	US 2004-838326	20040505
PRAI	KR 2003-32651	A	20030522		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 2005001274	ICM	H01L021-00
	ICS	H01L027-14; H01L029-82
	INCL	257414000; 438048000; 438052000; 257416000
	IPCI	H01L0021-00 [ICM,7]; H01L0027-14 [ICS,7]; H01L0029-82 [ICS,7]; H01L0029-66 [ICS,7,C*]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]
	NCL	257/414.000
	ECLA	H03H003/02; H03H009/02B8; H03H009/17A1

AB A method of manufacturing a film bulk acoustic resonator and the resonator manufactured thereby. The method includes the laminating a sacrificial layer on a semiconductor **substrate**, removing a predetd. area from the sacrificial layer to realize elec. contact between a signal line of the semiconductor **substrate** and a **lower electrode**
, forming the **lower electrode** by depositing metal film for **lower electrode** on the sacrificial layer, by patterning based on a shape of the sacrificial **layer**, forming a **piezoelec. layer** by depositing a **piezoelec.** material on the **lower electrode** and by patterning based on a shape of the **lower electrode**, and forming an **upper electrode** by depositing metal film on the **piezoelec. layer** and by patterning based on a shape of the **piezoelec. layer**, wherein at least one of a deposition pressure and a deposition power is controlled to generate upward stress when depositing the metal film for the **lower electrode.**
ST acoustic resonator metal film fabrication
IT Resonators
(acoustic; fabrication of acoustic resonators)
IT Cantilevers (components)
Electric contacts
Interconnections, electric
(fabrication of acoustic resonators)
IT Piezoelectric materials
(films; in fabrication of acoustic resonators)
IT **Coating** process
Lamination
Lithography
(in fabrication of acoustic resonators)
IT Metals, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(in fabrication of acoustic resonators)
IT Resonators

(piezoelec.; fabrication of acoustic resonators)
IT Films
(piezoelec.; in fabrication of acoustic resonators)
IT Surface acoustic wave devices
(resonators; fabrication of acoustic resonators)

L29 ANSWER 2 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:963367 HCAPLUS
DN 143:240077
ED Entered STN: 02 Sep 2005
TI Piezoelectric components, manufacture of piezoelectric components, and liquid injection heads
IN Li, Jin-Shan
PA Seiko Epson Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 14 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-22
ICS B41J002-045; B41J002-055; B41J002-16; H01L041-09; H01L041-18; H01L041-187
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 56, 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005236269	A2	20050902	JP 2005-4356	20050111
	US 2005236929	A1	20051027	US 2005-40090	20050124
PRAI	JP 2004-16256	A	20040123		
	JP 2005-4356	A	20050111		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2005236269	ICM	H01L041-22
	ICS	B41J002-045; B41J002-055; B41J002-16; H01L041-09; H01L041-18; H01L041-187
	IPCI	H01L0041-22 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; B41J0002-16 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-18 [ICS,7]; H01L0041-187 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	FTERM	2C057/AF03; 2C057/AF93; 2C057/AG12; 2C057/AG42; 2C057/AG44; 2C057/AP14; 2C057/AP52; 2C057/AP57; 2C057/BA03; 2C057/BA14
US 2005236929	IPCI	H01L0041-08 [ICM,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	NCL	310/311.000

AB The process for the title manufacture of piezoelec. components involves (1) repeatedly **coating** Ti seeds over a **lower electrode** on a **substrate**, (2) **coating** a piezoelec. precursor material over the Ti seed-**coated** layer on

the **lower electrode**, and (3) sintering the precursor
layer to be crystallized in formation of a **piezoelec. layer**
. The process provides a homogeneously formed and quality-improved
piezoelec. layer to **piezoelec.** components and
consequently to liquid injection heads.
ST titanium seed **coating** piezoelec sintering crystn liq injection
head
IT Piezoelectric materials
(films; piezoelec. components, manufacture of piezoelec. components, and
liquid injection heads)
IT Sputtering
(of titanium seed **layer**; **piezoelec.** components,
manufacture of piezoelec. components, and liquid injection heads)
IT Ink-jet printer heads
Piezoelectric materials
Piezoelectric transducers
(piezoelec. components, manufacture of piezoelec. components, and liquid
injection heads)
IT Films
(piezoelec.; piezoelec. components, manufacture of piezoelec. components,
and liquid injection heads)
IT 7631-86-9, Silica, properties
RL: PRP (Properties)
(elastic film for **piezoelec. layer**;
piezoelec. components, manufacture of piezoelec. components, and
liquid injection heads)
IT 1314-23-4, Zirconia, properties
RL: PRP (Properties)
(insulator film for **piezoelec. layer**;
piezoelec. components, manufacture of piezoelec. components, and
liquid injection heads)
IT 12626-81-2P, Lead titanate zirconate
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP
(Properties); PREP (Preparation); USES (Uses)
(**piezoelec. layer**, formation on titanium seed
layer; **piezoelec.** components, manufacture of piezoelec.
components, and liquid injection heads)
IT 7440-32-6P, Titanium, uses
RL: CAT (Catalyst use); PNU (Preparation, unclassified); PREP
(Preparation); USES (Uses)
(seed **layer** sputtered for **piezoelec.** film
formation; piezoelec. components, manufacture of piezoelec. components, and
liquid injection heads)

L29 ANSWER 3 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:586921 HCAPLUS
DN 143:106397
ED Entered STN: 08 Jul 2005
TI Ink-jet printers, piezoelectric heads therefor, manufacture thereof
employing dry-film photoresists, and alkaline developers for precise
patterning thereof
IN Hirasawa, Hiroshi
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 18 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM B41J002-16
ICS B41J002-045; B41J002-055; B81C001-00; G03F007-004; G03F007-32
CC 74-6 (Radiation Chemistry, Photochemistry, and Photographic and Other

Reprographic Processes)
Section cross-reference(s): 56, 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005178054	A2	20050707	JP 2003-419041	20031217
PRAI	JP 2003-419041		20031217		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2005178054	ICM	B41J002-16
	ICS	B41J002-045; B41J002-055; B81C001-00; G03F007-004; G03F007-32
	IPCI	B41J0002-16 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055 [ICS,7]; B81C0001-00 [ICS,7]; G03F0007-004 [ICS,7]; G03F0007-32 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; B81C0001-00 [I,A]; B81C0001-00 [I,C*]; G03F0007-004 [I,A]; G03F0007-004 [I,C*]; G03F0007-32 [I,A]; G03F0007-32 [I,C*]
	FTERM	2C057/AF40; 2C057/AF93; 2C057/AG14; 2C057/AG39; 2C057/AG44; 2C057/AG52; 2C057/AG55; 2C057/AN01; 2C057/AP02; 2C057/AP22; 2C057/AP25; 2C057/AP33; 2C057/AP37; 2C057/AP38; 2C057/AP47; 2C057/AP52; 2C057/AP55; 2C057/AQ06; 2C057/BA04; 2C057/BA14; 2H025/AA04; 2H025/AB20; 2H025/AD01; 2H025/AD03; 2H025/EA08; 2H025/FA17; 2H096/AA30; 2H096/BA01; 2H096/BA09; 2H096/CA16; 2H096/GA09; 2H096/GA11

AB The developers contain alkali and/or alkaline earth metal compds. and surfactants. The piezoelec. heads are manufactured by (i) forming **lower** and **upper electrode layers** and **piezoelec. layers** between them on **substrates** to give laminates, (ii) laminating alkali-developable dry-film photoresists on the laminates on the other side of the **substrates**, (iii) exposing the photoresists via masks, (iv) developing with the above developers to have patterns, (v) filling grooves, formed by removal of the photoresists, by (electroless) plating to give sidewalls for ink tanks, (vi) removing the residual photoresists to give the tanks, and (v) covering them with discharge hole-equipped nozzle plates and removing the **substrates**. Also claimed are ink-jet printed equipped with the heads, means for transporting the heads relatively to receptors, and means for supplying recording signals on the heads.

ST ink jet printer piezoelec head patterning; dry film photoresist alkali developer surfactant; photoresist precise patterning nickel plating printer head

IT Alkali metal compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(developers; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT Photoresists
(dry-film; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT **Coating** process
(electroless; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT Ink-jet printer heads

Ink-jet printers
Photolithography
Piezoelectric apparatus
(manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT Alkaline earth compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT **Coating** process
(plating; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 7440-02-0, N 100ES, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(N 100ES, N 1000, plating; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 497-19-8, Sodium carbonate, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(developers; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 7440-06-4, Platinum, uses 7440-50-8, Copper, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(electrodes; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 857082-38-3, AR 340
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 12597-68-1, Stainless steel, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(nozzle plates; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 107478-15-9, Lead titanium zirconium oxide ($PbTi_{0.47}Zr_{0.53}O_3$)
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(**piezoelec. layers**; manufacture of **piezoelec.** heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

IT 112-02-7 5168-91-2 25155-30-0 70656-69-8
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(surfactants; manufacture of piezoelec. heads for ink-jet printers by precise patterning of dry-film photoresists with alkaline developers and subsequent plating)

L29 ANSWER 4 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:563944 HCAPLUS
DN 143:70067
ED Entered STN: 30 Jun 2005
TI Fabrication of piezoelectric device
IN Muramoto, Miyuki; Murai, Masami

PA Seiko Epson Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-22
ICS B41J002-16; H01L041-09; H01L041-187
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005175230	A2	20050630	JP 2003-413981	20031211
PRAI	JP 2003-413981		20031211		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2005175230	ICM	H01L041-22
	ICS	B41J002-16; H01L041-09; H01L041-187
	IPCI	H01L0041-22 [ICM,7]; B41J0002-16 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	FTERM	2C057/AF93; 2C057/AG47; 2C057/AP14; 2C057/AP57; 2C057/BA14

AB A method for fabricating a durable piezoelec. device involves forming a **bottom electrode** on a **substrate**, removing the surface water of the **substrate**, **coating** the **substrate** with a precursor film of a piezoelec. material, firing the precursor film to form a **piezoelec. layer**, and forming a **top electrode** on the **piezoelec. layer**. Optionally, the surface water may be removed by heating and/or HMDS treatment, and the precursor film may be formed by a sol-gel method.
ST piezoelec device fabrication **coating**
IT **Coating** process
Piezoelectric apparatus
Sol-gel processing
(fabrication of piezoelec. device by **coating**)
IT 999-97-3, Hexamethyldisilazane
RL: NUU (Other use, unclassified); USES (Uses)
(fabrication of piezoelec. device by **coating**)
IT 7732-18-5, Water, processes
RL: REM (Removal or disposal); PROC (Process)
(fabrication of piezoelec. device by **coating**)

L29 ANSWER 5 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:100563 HCAPLUS
DN 140:155784
ED Entered STN: 08 Feb 2004
TI Manufacturing method of piezoelectric/**electrostrictive** film type device
IN Ohnishi, Takao; Murasato, Masahiro; Bessho, Yuki; Takahashi, Nobuo
PA Ngk Insulators, Ltd., Japan
SO U.S. Pat. Appl. Publ., 26 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM B05D005-12

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     ICS  B05D003-02; G21H001-00
INCL 427100000; 427372200; 427457000; 427402000
CC   76-7 (Electric Phenomena)
FAN.CNT 1
     PATENT NO.          KIND  DATE       APPLICATION NO.       DATE
     ---------------     ----  --------   --------------------  --------
PI   US 2004022935        A1   20040205   US 2003-630887        20030730
     WO 2004013918        A1   20040212   WO 2003-JP9609        20030729
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
             GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
             LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM,
             PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,
             TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,
             KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,
             FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,
             BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
     AU 2003252300        A1   20040223   AU 2003-252300        20030729
PRAI US 2002-400513P      P    20020802
     WO 2003-JP9609       W    20030729
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 2004022935   ICM    B05D005-12
                 ICS    B05D003-02; G21H001-00
                 INCL   427100000; 427372200; 427457000; 427402000
                 IPCI   B05D0005-12 [ICM,7]; B05D0003-02 [ICS,7]; G21H0001-00
                        [ICS,7]
                 IPCR   H01L0041-09 [N,A]; H01L0041-09 [N,C*]; H01L0041-24
                        [I,A]; H01L0041-24 [I,C*]
                 NCL    427/100.000
                 ECLA   H01L041/24
 WO 2004013918   IPCI   H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]; B41J0002-045
                        [ICS,7]
                 IPCR   H01L0041-09 [N,A]; H01L0041-09 [N,C*]; H01L0041-24
                        [I,A]; H01L0041-24 [I,C*]
                 ECLA   H01L041/24
 AU 2003252300   IPCI   H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]; B41J0002-045
                        [ICS,7]
                 IPCR   H01L0041-09 [N,A]; H01L0041-09 [N,C*]; H01L0041-24
                        [I,A]; H01L0041-24 [I,C*]
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AB The invention relates to a process for making a piezoelec./ **electrostrictive** film type device including a ceramic **substrate**, a piezoelec./**electrostrictive** operation portion containing a **lower electrode**, a **piezoelec ./electrostrictive layer**, and **upper electrode stacked** on the **substrate**, and the **piezoelec./electrostrictive layer** being formed beyond at least one of electrodes to form **projected** portions at its ends, the method comprising the steps of forming the **piezoelec ./electrostrictive layer** beyond at least one of electrodes to **project** ends of the layer; applying a **coating** liquid in an amount sufficient to make the **coating** liquid permeate through a **gap** between at least a **projected** portion of the **piezoelec./electrostrictive layer** and the **substrate**, and **coat** a predetd. portion of said at least one of electrodes; and drying thus applied **coating** liquid to form a coupling member to couple a **projected** portion of the **piezoelec./**

electrostrictive layer. The piezoelec./ **electrostrictive** operation portion may be a multilayered structure.

ST dpiezoelec **electrostrictive** film **coating**
IT **Electrostriction**
(apparatus; manufacture of piezoelec./**electrostrictive** film type device)
IT Piezoelectric materials
(films; manufacture of piezoelec./**electrostrictive** film type device)
IT **Coating** process
(manufacture of piezoelec./**electrostrictive** film type device)
IT Films
(piezoelec.; manufacture of piezoelec./**electrostrictive** film type device)

L29 ANSWER 6 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:722623 HCAPLUS
DN 141:234456
ED Entered STN: 03 Sep 2004
TI Fabrication of piezoelectric device
IN Yamada, Kazuhiro
PA Murata Mfg. Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-22
ICS H01L041-08
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004247406	A2	20040902	JP 2003-33855	20030212
PRAI	JP 2003-33855		20030212		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2004247406	ICM	H01L041-22
	ICS	H01L041-08
	IPCI	H01L0041-22 [ICM,7]; H01L0041-08 [ICS,7]
	IPCR	H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]

AB A method for fabricating a piezoelec. device at a high yield involves preparing a Si **substrate** having silica layers on both of its major sides, forming a **bottom electrode layer**, **piezoelec. layer**, and **top electrode** layer on the first silica layer via an optional middle layer, **coating** the first silica layer with a thermally hardened fluoropolymer, forming a resist pattern on the second silica layer, wet etching the **substrate** using the pattern to form a diaphragm structure, and removing the fluoropolymer.
ST silicon piezoelec device fabrication wet etching
IT Etching
Piezoelectric apparatus
(fabrication of silicon piezoelec. device by wet etching)
IT Fluoropolymers, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fabrication of silicon piezoelec. device by wet etching)
IT 7440-21-3, Silicon, processes

RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of silicon piezoelec. device by wet etching)

L29 ANSWER 7 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:530511 HCAPLUS
DN 141:63442
ED Entered STN: 02 Jul 2004
TI Piezoelectric/**electrostrictive** membrane type elements
IN Takahashi, Nobuo; Yamaguchi, Hirofumi
PA NGK Insulators, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-09
ICS C04B035-46; H01L041-187; H01L041-193
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004186436	A2	20040702	JP 2002-351694	20021203
PRAI	JP 2002-351694		20021203		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2004186436	ICM	H01L041-09
	ICS	C04B035-46; H01L041-187; H01L041-193
	IPCI	H01L0041-09 [ICM,7]; C04B0035-46 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-193 [ICS,7]; H01L0041-18 [ICS,7,C*]
	IPCR	C04B0035-46 [I,A]; C04B0035-46 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-193 [I,A]
	FTERM	4G031/AA01; 4G031/AA02; 4G031/AA07; 4G031/AA08; 4G031/AA11; 4G031/AA35; 4G031/BA10; 4G031/CA08

AB The title elements consist of a ceramic **substrate**, a **lower** section **electrode** and auxiliary electrodes, piezoelec./**electrostrictive** membrane, an **upper electrode**, and a $(Bi_{0.5}Na_{0.5})TiO_3$-based binder layer, where between the ceramic **substrate** and the binder layer, there exits an uneven-distributed layer (thickness 1-5 µm) containing the components contained in the ceramic **substrate** and/or the binder layer. Preferably, the ceramic **substrate** is made of ZrO_2-based material.
ST piezoelec **electrostrictive** membrane element ceramic **substrate**
IT Ceramics
Electrostriction
Membranes, nonbiological
Piezoelectric materials
(piezoelec./**electrostrictive** membrane type elements having ceramic **substrates**, binder layer and uneven-distributed layer in between)
IT 1305-78-8, Calcia, uses 1312-81-8, Lanthanum oxide 1314-36-9, Yttria, uses 7631-86-9, Silica, uses
RL: MOA (Modifier or additive use); USES (Uses)
(binder **layer** containing; **piezoelec./ electrostrictive** membrane type elements having ceramic **substrates**, binder layer and uneven-distributed layer in

```
        between)
IT    12233-00-0, Bismuth sodium titanium oxide (Bi0.5Na0.5TiO3)
      RL: TEM (Technical or engineered material use); USES (Uses)
         (binder layer containing; piezoelec./
         electrostrictive membrane type elements having ceramic
         substrates, binder layer and uneven-distributed layer in
         between)
IT    1314-23-4, Zirconia, uses
      RL: TEM (Technical or engineered material use); USES (Uses)
         (ceramic substrates; piezoelec./electrostrictive
         membrane type elements having ceramic substrates, binder
         layer and uneven-distributed layer in between)

L29   ANSWER 8 OF 37  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN    2004:390008  HCAPLUS
DN    140:384701
ED    Entered STN:  13 May 2004
TI    Ultrathin multilayer ceramic piezoelectric device and its fabrication
IN    Handa, Shinichi
PA    Kyocera Corp., Japan
SO    Jpn. Kokai Tokkyo Koho, 12 pp.
      CODEN: JKXXAF
DT    Patent
LA    Japanese
IC    ICM  H01L041-09
      ICS  B41J002-045; B41J002-055; B41J002-16; C04B035-622; H01L041-187;
           H01L041-22; H01L041-24
CC    76-7 (Electric Phenomena)
      Section cross-reference(s): 74
FAN.CNT 1
      PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
      ---------------     ----   --------    --------------------   --------
PI    JP 2004140193        A2    20040513    JP 2002-303547         20021017
      JP 2005223354        A2    20050818    JP 2005-95002          20050329
PRAI  JP 2002-303547       A3    20021017
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 2004140193   ICM    H01L041-09
                 ICS    B41J002-045; B41J002-055; B41J002-16; C04B035-622;
                        H01L041-187; H01L041-22; H01L041-24
                 IPCI   H01L0041-09 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055
                        [ICS,7]; B41J0002-16 [ICS,7]; C04B0035-622 [ICS,7];
                        H01L0041-187 [ICS,7]; H01L0041-18 [ICS,7,C*];
                        H01L0041-22 [ICS,7]; H01L0041-24 [ICS,7]
                 IPCR   B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055
                        [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A];
                        B41J0002-16 [I,C*]; C04B0035-622 [I,A]; C04B0035-622
                        [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*];
                        H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22
                        [I,A]; H01L0041-22 [I,C*]; H01L0041-24 [I,A];
                        H01L0041-24 [I,C*]
                 FTERM  2C057/AF01; 2C057/AF37; 2C057/AF93; 2C057/AG12;
                        2C057/AG44; 2C057/AG47; 2C057/AG52; 2C057/AG92;
                        2C057/AG93; 2C057/AP02; 2C057/AP58; 2C057/AP90;
                        2C057/AQ10; 2C057/BA04; 2C057/BA14; 4G030/AA16;
                        4G030/AA17; 4G030/AA40; 4G030/BA10; 4G030/CA03;
                        4G030/CA07; 4G030/CA08; 4G030/GA19; 4G030/GA22
 JP 2005223354   IPCI   H01L0041-22 [ICM,7]; B41J0002-045 [ICS,7]; B41J0002-055
                        [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-187 [ICS,7];
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H01L0041-18 [ICS,7,C*]; H01L0041-24 [ICS,7]
IPCR B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]
FTERM 2C057/AF23; 2C057/AG12; 2C057/AG44; 2C057/AG47; 2C057/AP02; 2C057/AP14; 2C057/BA04; 2C057/BA14

AB The device comprises a multilayered ceramic **substrate** with thickness ≤50 μm on which multiple piezoelec. devices (each device comprises a **piezoelec. layer** sandwiched **between** a pair of **electrodes**) with thickness ≤50 μm are arranged, and have total thickness ≤100 μm with ≤10% fluctuation. The device is fabricated by steps including tape slurry **coating** of an organic binder slurry containing piezoelec. ceramic powder with average particle size ≤1 μm, pressing, and firing. The devices provides precise amount of piezoelec. displacement, and are suitable for actuators of ink-jet printer heads.

ST piezoelec ceramic multilayer ultrathin manuf tape slurry **coating** ; ink jet printer head actuator piezoelec device

IT Ink-jet printer heads
(actuators; ultrathin multilayer ceramic piezoelec. device fabricated by tape slurry **coating**, pressing, and firing)

IT Piezoelectric materials
(ceramic, devices; ultrathin multilayer ceramic piezoelec. device fabricated by tape slurry **coating**, pressing, and firing)

IT Piezoelectric apparatus
(ceramic, multilayer; ultrathin multilayer ceramic piezoelec. device fabricated by tape slurry **coating**, pressing, and firing)

IT Actuators
(ink-jet printer heads; ultrathin multilayer ceramic piezoelec. device fabricated by tape slurry **coating**, pressing, and firing)

IT Ceramics
(piezoelec., devices; ultrathin multilayer ceramic piezoelec. device fabricated by tape slurry **coating**, pressing, and firing)

IT **Coating** process
(slurry, tape; ultrathin multilayer ceramic piezoelec. device fabricated by tape slurry **coating**, pressing, and firing)

IT 79-10-7D, Acrylic acid, derivs.
RL: NUU (Other use, unclassified); USES (Uses)
(binder; in fabrication of ultrathin multilayer ceramic piezoelec. device by tape slurry **coating**, pressing, and firing)

IT 12626-81-2, Lead titanate zirconate
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(piezoelec. ceramic powder; in fabrication of ultrathin multilayer ceramic piezoelec. device by tape slurry **coating**, pressing, and firing)

L29 ANSWER 9 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:36779 HCAPLUS
DN 140:103396
ED Entered STN: 16 Jan 2004
TI Piezoelectric/**electrostrictive** film device with high resonance frequency and high speed response
IN Takahashi, Nobuo; Bessho, Yuki; Kobayashi, Nobuyuki; Murasato, Masahiro
PA NGK Insulators, Ltd., Japan
SO Eur. Pat. Appl., 32 pp.
CODEN: EPXXDW

DT Patent
LA English
IC ICM H01L041-09
ICS H01L041-22
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1381093	A2	20040114	EP 2003-254404	20030711
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	US 2004007947	A1	20040115	US 2003-615545	20030708
	JP 2005050830	A2	20050224	JP 2003-193850	20030708
PRAI	US 2002-395503P	P	20020712		
	JP 2003-160430	A	20030605		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1381093	ICM	H01L041-09
	ICS	H01L041-22
	IPCI	H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	ECLA	H01L041/09G; H01L041/22
US 2004007947	IPCI	H02N0002-00 [ICM,7]; H01L0041-04 [ICS,7]; H01L0041-00 [ICS,7,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	NCL	310/363.000
	ECLA	H01L041/09G; H01L041/22
JP 2005050830	IPCI	H01L0041-09 [ICM,7]; H01L0041-083 [ICS,7]; H01L0041-18 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-22 [ICS,7]; H02N0002-00 [ICS,7]
	IPCR	H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]; H02N0002-00 [I,A]; H02N0002-00 [I,C*]
	FTERM	5H680/AA04; 5H680/AA06; 5H680/BC01; 5H680/BC04; 5H680/DD15; 5H680/DD23; 5H680/DD37; 5H680/DD39; 5H680/DD95; 5H680/FF17; 5H680/FF26; 5H680/GG11; 5H680/GG42; 5H680/GG43

AB The present invention discloses a piezoelec./**electrostrictive** film device which has a flexural displacement and durability equal to or more than those of a related-art piezoelec./**electrostrictive** film device and which has a remarkably high resonance frequency and which is superior in high-speed response. The piezoelec./ **electrostrictive** film device comprises the following: a **substrate** formed of ceramic; and a piezoelec./ **electrostrictive** operation portion including a **lower electrode**, **piezoelec./electrostrictive layer**, and **upper electrode** which are successively **stacked** on the **substrate** and including a **projecting** end of the **piezoelec./ electrostrictive layer** with which an upper surface of the **lower electrode** and a **lower** surface of the **upper electrode** are **coated.** A **projecting** portion of the **piezoelec./ electrostrictive layer** comprises a coupling member constituted of a hybrid material in which inorg. particles are scattered

in a matrix of a **polymer** compound, and is coupled to the **substrate.**

ST piezoelec **electrostrictive** film high resonance frequency

IT Piezoelectric materials
(ceramic; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT **Polysiloxanes**, uses
RL: DEV (Device component use); USES (Uses)
(coupling particle; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT Piezoelectric materials
(films; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT Electric contacts
Electrostriction
Piezoelectric apparatus
(piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT Ceramics
Films
(piezoelec.; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT **Coating** process
(spin; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT 1314-36-9, Yttria, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(ZrO_2 stabilized with; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT 7631-86-9, Silica, uses
RL: DEV (Device component use); USES (Uses)
(coupling particle; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT 7440-06-4, Platinum, uses
RL: DEV (Device component use); USES (Uses)
(electrode; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT 12030-85-2, Potassium niobium oxide ($KNbO_3$) 12233-00-0, Bismuth sodium titanium oxide ($Bi_{0.5}Na_{0.5}TiO_3$) 118692-25-4, Lead magnesium niobium titanium zirconium oxide ($PbMg_{0.12}Nb_{0.25}Ti_{0.38}Zr_{0.25}O_3$) 141051-68-5, Lead magnesium niobium titanium zirconium oxide ($PbMg_{0.07}Nb_{0.13}Ti_{0.43}Zr_{0.37}O_3$) 444732-87-0, Lead magnesium nickel niobium titanium zirconium oxide ($PbMg_{0.05}Ni_{0.01}Nb_{0.13}Ti_{0.43}Zr_{0.37}O_3$)
RL: DEV (Device component use); USES (Uses)
(piezoelec. material; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT 64417-98-7, Yttrium zirconium oxide
RL: DEV (Device component use); USES (Uses)
(**substrate**; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

IT 1314-23-4, Zirconia, uses
RL: DEV (Device component use); USES (Uses)
(yttria-stabilized; piezoelec./**electrostrictive** film device with high resonance frequency and high speed response)

L29 ANSWER 10 OF 37 INSPEC (C) 2006 IET on STN

AN 2005:8236161 INSPEC DN A2005-04-0670-007; B2005-02-7230-058

TI Miniature pressure sensor and micromachined actuator structure based on low-temperature-cofired ceramics and piezoelectric material

AU Khanna, P.K.; Hornbostel, B.; Grimme, R.; Schafer, W.; Dorner, J.
(Fraunhofer-Inst. fur Produktionstechnik und Automatisierung, Stuttgart,
Germany)
SO Materials Chemistry and Physics (15 Sept. 2004), vol.87, no.1, p. 173-8,
7 refs.
CODEN: MCHPDR, ISSN: 0254-0584
SICI: 0254-0584(20040915)87:1L.173:MPSM;1-Z
Price: 0254-0584/2004/$30.00
Published by: Elsevier, Netherlands
DT Journal
TC Practical; Experimental
CY Netherlands
LA English
AB A novel method to fabricate pressure sensors using low-temperature
co-fired ceramic (LTCC) and polyvinylidene fluoride (PVDF) piezoelectric
polymer is presented. The basic structure consists essentially of
two low-temperature co-fired ceramic **substrates** with an
interlayer of polyvinylidene fluoride sandwiched between them. For the
top and **bottom electrodes**, a thin conductive
film is deposited on both sides of the polyvinylidene fluoride layer, but
simultaneously polyvinylidene fluoride layers with pre-deposited
electrodes are also utilized. The polyvinylidene fluoride **polymer**
is normally polarized and has a remnant polarization; therefore, no
further electrical poling is required till further processing is done
below 80°C. An adhesive layer is selectively provided on each
electrode for the attachment of the low-temperature co-fired ceramic
substrate on the top and bottom of the interlayer and in
realizing the sensor structure. The electrical connections are realized
through vias, and these via openings also expose the sensing layer to the
external pressure. In a parallel effort, an actuator structure developed
using laser micromachining for later coupling with the sensor device has
also been briefly described. The initial experiments indicate that the
low-temperature co-fired ceramic technology can be used to fabricate
actuator structures and when combined with polyvinylidene fluoride
polymer, it can lead to fabrication of sensors in a simplified
manner
CC A0670D Sensing and detecting devices; A0630N Pressure measurement; A0710C
Micromechanical devices and systems; A8115 Methods of thin film
deposition; A6855 Thin film growth, structure, and epitaxy; A4262A Laser
materials processing; A7760 Piezoelectricity and electrostriction; A7730
Dielectric polarization and depolarization effects; B7230 Sensing devices
and transducers; B7320V Pressure and vacuum measurement; B8380M
Microactuators; B2575F Fabrication of micromechanical devices; B2860A
Piezoelectric devices; B4360B Laser materials processing; B0520 Thin film
growth and epitaxy; B0540 Ceramics and refractories (engineering
materials science)
CT dielectric polarisation; laser beam machining; microactuators;
micromachining; piezoceramics; piezoelectric actuators; piezoelectricity;
polymer films; pressure sensors
ST miniature pressure sensor; micromachined actuator structure; low
temperature cofired ceramics substrate; LTCC; polyvinylidene fluoride
piezoelectric polymer; polyvinylidene fluoride interlayer; thin
conductive film; predeposited electrodes; remnant polarization; adhesive
layer; laser micromachining; electrical connections; poling
ET C

L29 ANSWER 11 OF 37 INSPEC (C) 2006 IET on STN
AN 2006:8885297 INSPEC
TI Bismuth titanate thin film for pressure sensor prepared by sol gel method
AU Chong Cheong Wei; Yahaya, M.; Salleh, M.M. (Inst. of Microeng. &

Nanoelectron., Univ. Kebangsaan Malaysia, Selangor, Malaysia)
SO 2004 IEEE International Conference on Semiconductor Electronics (IEEE Cat. No.04EX917C), 2004, p. 4 pp. of CD-ROM pp., 10 refs.
ISBN: 0 7803 8659 0
Price: 0 7803 8659 0/2004/$20.00
Published by: IEEE, Piscataway, NJ, USA
Conference: 2004 IEEE International Conference on Semiconductor Electronics, Kuala Lumpur, Malaysia, 7-9 Dec. 2004
DT Conference; Conference Article
TC Practical; Experimental
CY United States
LA English
AB Bismuth titanate, Bi4Ti3O12 thin film pressure sensor was fabricated by sol gel method. The Bi4Ti3O12 thin film was synthesized on **substrate** Si/ SiO2 / RuO2 at low temperature to avoid short-circuit problem. The film was obtained by depositing multiple Bi-Ti-O spin **coat** layers on **substrate**, followed by heating of each layer at 300 C in air for 15 mins. Ag film was then deposited as **top electrode.** The piezoelectric response of the sensor was tested by pneumatic loading method. It was found that the sensor was sensitive to the applied pressure and the response recovered back when the pressure was removed from the chamber. This study showed that the piezoelectric Bi4Ti3O12 thin film prepared by sol gel method potentially be used as a stable pressure sensor
CC A0670D Sensing and detecting devices; A8115L Deposition from liquid phases (melts and solutions); A0630N Pressure measurement; B7230 Sensing devices and transducers; B7320V Pressure and vacuum measurement; B0520J Deposition from liquid phases; B2810F Piezoelectric and ferroelectric materials
CT bismuth compounds; piezoelectric thin films; piezoelectric transducers; pressure sensors; ruthenium compounds; semiconductor thin films; silicon; silicon compounds; silver; sol-gel processing; spin **coating**; thin film devices
ST thin film pressure sensor; sol gel method; low temperature; short-circuit problem; spin coat layer; heating; piezoelectric response; pneumatic loading; 300 C; 15 min; Bi4Ti3O12; Si-SiO2-RuO2; Bi-Ti-O
CHI Bi4Ti3O12 ss, Bi4 ss, O12 ss, Ti3 ss, Bi ss, Ti ss, O ss; Si-SiO2-RuO2 int, RuO2 int, SiO2 int, O2 int, Ru int, Si int, O int, RuO2 bin, SiO2 bin, O2 bin, Ru bin, Si bin, O bin, Si el; Bi-Ti-O int, Bi int, Ti int, O int, Bi el, Ti el, O el
PHP temperature 5.73E+02 K; time 9.0E+02 s
ET O*Ti; Ti3O12; Ti cp; cp; O cp; O*Ru*Si; O sy 3; sy 3; Ru sy 3; Si sy 3; SiO2; Si cp; RuO2; Ru cp; SiO2-RuO2; Ti-O; Ti3O; Bi; O; Ti; O*Si; SiO; O*Ru; RuO; Ru; Si; Bi*O*Ti; Bi sy 3; Ti sy 3; Bi4Ti3O12; Bi cp; Bi-Ti-O; Ag

L29 ANSWER 12 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:1005231 HCAPLUS
ED Entered STN: 25 Dec 2003
TI Piezoelectric/**electrostrictive** film device
IN Takahashi, Nobuo; Bessho, Yuki
PA Ngk Insulators, Ltd., Japan
SO U.S. Pat. Appl. Publ.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01L041-08
INCL 310324000
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

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PI   US 2003234595         A1    20031225    US 2003-463163         20030617
     US 7019438            B2    20060328
     JP 2004274014         A2    20040930    JP 2003-169552         20030613
PRAI JP 2002-182212        A     20020621
     US 2002-394386P       P     20020708
     JP 2002-218857        A     20020726
     JP 2002-299382        A     20021011
     JP 2003-5714          A     20030114
     JP 2003-169552        A     20030613
CLASS
 PATENT NO.       CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 20030234595   ICM    H01L041-08
                  INCL   310324000
                  IPCI   H01L0041-08 [I,A]
                  IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]
                  NCL    310/324.000
                  ECLA   H01L041/09G
 JP 2004274014    IPCI   H01L0041-09 [ICM,7]; H01L0041-083 [ICS,7]; H01L0041-187
                         [ICS,7]; H01L0041-18 [ICS,7,C*]; H01L0041-22 [ICS,7]
                  IPCR   H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-09
                         [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*];
                         H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22
                         [I,C*]
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AB There is provided a piezoelectric/**electrostrictive** film device having larger resonant frequency while having flexural displacement that is equal to or superior to that of conventional piezoelectric/ **electrostrictive** film device, and being excellent in rapid response. The piezoelectric/**electrostrictive** film device comprises a **substrate** comprising ceramics, and a piezoelectric/ **electrostrictive** actuator including a **lower electrode**, a **piezoelectric/electrostrictive layer** and an **upper electrode** that are sequentially layered on the **substrate**, the **piezoelectric /electrostrictive layer** covering an upper surface of the **lower electrode** and a **lower** surface of the **upper electrode** and protruding over edges thereof, wherein the protruded portion of the **piezoelectric/ electrostrictive layer** is coupled to the **substrate** via a coupling member. The present device shows substantially the same flexural displacement, but a larger resonant frequency of 3% or more, when compared with those of a piezoelectric/ **electrostrictive** film device comprising same materials and same configuration as the present device, but without coupling member.

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Anon; JP 04085976 1992 HCAPLUS
(2) Anon; JP 05124188 1993 HCAPLUS
(3) Anon; JP 06260694 1994 HCAPLUS
(4) Anon; JP 09162452 1997
(5) Anon; JP 2000210615 2000 HCAPLUS
(6) Hosono; US 5381171 A 1995
(7) Shimogawa; US 6584660 B1 2003
(8) Suzuki; US 5469012 A 1995
(9) Takeuchi; US 5376857 A 1994 HCAPLUS
(10) Takeuchi; US 5594292 A 1997 HCAPLUS
(11) Takeuchi; US 5814920 A 1998 HCAPLUS

L29 ANSWER 13 OF 37 HCAPLUS

AN 2003:628534 HCAPLUS
DN 139:158497
ED Entered STN: 15 Aug 2003
TI Thin-film piezoelectric components, component fabrication, and hard disk-driving thin-film piezoelectric devices
IN Mikami, Hiromasa; Uchiyama, Hirokazu; Kita, Hiroyuki; Kuwashima, Hideki; Torii, Hideo
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-083
ICS G11B005-596; G11B021-10; G11B021-21; H01L041-08; H01L041-18; H01L041-22
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003229611	A2	20030815	JP 2002-28272	20020205
PRAI	JP 2002-28272		20020205		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2003229611	ICM	H01L041-083
	ICS	G11B005-596; G11B021-10; G11B021-21; H01L041-08; H01L041-18; H01L041-22
	IPCI	H01L0041-083 [ICM,7]; G11B0005-596 [ICS,7]; G11B0021-10 [ICS,7]; G11B0021-21 [ICS,7]; H01L0041-08 [ICS,7]; H01L0041-18 [ICS,7]; H01L0041-22 [ICS,7]
	IPCR	G11B0005-596 [I,A]; G11B0005-596 [I,C*]; G11B0021-10 [I,A]; G11B0021-10 [I,C*]; G11B0021-21 [I,A]; G11B0021-21 [I,C*]; H01L0041-08 [I,A]; H01L0041-08 [I,C*]; H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]

AB The title components comprise (1) a 1st laminate prepared by laminating a 1st electrode metal film, a 1st thin film **piezoelec. layer**, and a 2nd **electrode** metal film, (2) a 2nd laminate prepared by laminating a 3rd electrode metal film, a 2nd thin film **piezoelec. layer**, and a 4th electrode metal film, (3) an adhesive layer to bind the 1st laminate and the 2nd laminate by the 2nd and 4th electrode metal films, (4) a 1st terminal which is at least partly **coated** with a **polymer** and is provided for impression of voltage across the 1st and 3rd electrode metal films, and (5) a 2nd terminal which is provided for impression of ground level voltage across the 2nd and 4th electrode metal films. The **substrate** is a Si **substrate** deposited with a MgO film instead of a single-crystal MgO **substrate** to give economical device manufacturing
ST magnesia film deposition silicon **substrate** piezoelec laminate
IT **Coating** materials
(magnesia thin film on silicon **substrate**; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)
IT Adhesion, physical
(of piezoelec. laminates; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)

IT Piezoelectric apparatus
(thin film laminates; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)
IT Piezoelectric materials
(thin film; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)
IT 7440-06-4, Platinum, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(electrodes; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)
IT 12626-81-2, Lead titanate zirconate
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(piezoelec. thin film and devices; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)
IT 7440-21-3, Silicon, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(semiconductor **substrate**, magnesia film deposition on; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)
IT 1309-48-4, Magnesium oxide (MgO), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(thin film deposition on silicon **substrate**; thin-film piezoelec. components and component fabrication on a magnesia-**coated** silicon **substrate** and hard disk-driving thin-film piezoelec. devices)

L29 ANSWER 14 OF 37 JICST-EPlus COPYRIGHT 2006 JST on STN
AN 1030737450 JICST-EPlus
TI Preparation of Ba(Ti,Zr)O3 Thick Films on Silicon **Substrate** by Screen Printing
AU FUTAKUCHI T; SAKAI Y
FUJITA N; ADACHI M
CS Toyama Industrial Technol. Center, Toyama, Jpn
Toyama Prefectural Univ., Toyama, Jpn
SO Jpn J Appl Phys Part 1, (2003) vol. 42, no. 9B, pp. 5904-5907. Journal Code: G0520B (Fig. 8, Tbl. 1, Ref. 12)
ISSN: 0021-4922
CY Japan
DT Journal; Article
LA English
STA New
AB BaTi0.975Zr0.025O3 thick films were prepared by a screen-printing method on Pt **bottom electrodes** using silicon **substrates** in the firing temperature range from 1330.DEG.C. to 1370.DEG.C.. The high-temperature sintering of Pt **bottom electrodes** and Ba(Ti,Zr)O3 thick films was successfully achieved using silicon **substrates** with a fairly thick oxide **layer**. The ferroelectric and **piezoelectric** properties of the thick films were examined. The remanent polarization of the thick films increased with increasing firing temperature. A remanent polarization of 13.8 MC/cm2 for a Ba(Ti,Zr)O3 thick film was obtained at a firing temperature of 1370.DEG.C.. The longitudinal piezoelectric constant d33 calculated from a unipolar signal (10 kV/cm, 1 Hz) curve was 610 pC/N for the thick film fired at 1370.DEG.C.. (author abst.)
CC BM05030B; BK14050P (537.226.4; 539.23:54-31)

CT ferroelectrics; barium compound; titanate; zirconate; paste; screen printing(graphic arts); sintering; temperature dependence; film thickness; optical microscopy; platinum electrode; **substrate**(plate); silicon; thermal diffusion; grain size(crystal); dielectric polarization; hysteresis; **electrostriction**; residual polarization; longitudinal mode; piezoelectricity; interface(surface); surface reaction

BT dielectrics; dielectric material; material; alkaline earth metal compound; oxoate; oxygen compound; oxygen group element compound; titanium compound; 4A group element compound; transition metal compound; zirconium compound; object; printing(graphic arts); benefication of ore; heat treatment; treatment; dependence; thickness; length; geometric quantity; microscopy; observation and view; electrode; plate classified by application; plate(material); third row element; element; carbon group element; diffusion; transport phenomenon; phenomenon; particle size(ratio); degree; polarization(phenomenon); polarization; irreversible process; process; electromechanical effect; electrical property; electric field effect; effect; mode; face; heterogeneous reaction; chemical reaction

ST interface reaction

L29 ANSWER 15 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:1130428 HCAPLUS
DN 142:421884
ED Entered STN: 27 Dec 2004
TI Transversal mode piezoelectric actuator
IN Yin, Qing Rui; Li, Guorong; Chen, Daren; Huang, Tony; Yao, Xi; Zhu, Wei Guang
PA Data Storage Institute, Singapore; Nanyang Technological University; Xian Jiaotong University; Shanghai Institute of Ceramics
SO Singapore Pat. Appl., 20 pp.
CODEN: SGXXAI
DT Patent
LA English
IC ICM H01L041-083
ICS H01L041-09
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	SG 91811	A1	20021015	SG 1999-1297	19990313
PRAI	SG 1999-1297		19990313		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
SG 91811	ICM	H01L041-083
	ICS	H01L041-09
	IPCI	H01L0041-083 [ICM,7]; H01L0041-09 [ICS,7]
	IPCR	H01L0041-083 [I,A]; H01L0041-083 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]

AB A transversal mode monolithic multilayer piezoelec. actuator (TM-MMPA) and method for making the same are disclosed. The thickness of all of the **piezoelec. layers** are the same, and metal electrodes are prepared on the upper and lower surfaces of the actuator. Elastic insulation layers are formed to cover the metal electrodes. All **piezoelec. layers between** the **electrodes** become piezoelec. responsive after poling, thus, no hindrance occurs to transversal displacement, whereas a large force to hinder the transversal movement is present in existing longitudinal mode actuators due to the non-piezoelec. responsive top and bottom layers. The present TM-MMPA is suitable for practical use where a single transversal

mode piezoelec. bar is generally used, and can also be used where low
driving voltages are required, where the single bar piezoelec. actuator
can not.
ST transversal mode monolithic multilayer piezoelec actuator
IT Electric contacts
Electrostriction
Piezoelectric materials
(in transversal mode monolithic multilayer piezoelec.
actuatortransversal mode monolithic multilayer piezoelec. actuator)
IT Multilayers
(transversal mode monolithic multilayer piezoelec. actuator)
IT **Coating** materials
Electric insulators
(transversal mode monolithic multilayer piezoelec. actuator comprising)
IT Metals, uses
RL: NUU (Other use, unclassified); USES (Uses)
(transversal mode monolithic multilayer piezoelec. actuator comprising
metal electrodes)
IT Ceramics
(transversal mode monolithic multilayer piezoelec. actuator comprising
protective **coatings** from)
IT Piezoelectric actuators
(transversal mode piezoelec. actuator)
IT Electrically conductive pastes
(use in transversal mode monolithic multilayer piezoelec.
actuatortransversal mode monolithic multilayer piezoelec. actuator)
IT 850214-03-8 850214-04-9, Barium lead lithium niobium sodium oxide
(Ba2.6-3.25Pb1.4-1.75Li0.12-0.24Nb10Na0.88-1.76O30)
RL: NUU (Other use, unclassified); USES (Uses)
(transversal mode monolithic multilayer piezoelec. actuator comprising)
IT 12735-99-8 12772-01-9
RL: DEV (Device component use); USES (Uses)
(transversal mode monolithic multilayer piezoelec. actuator comprising
metal electrodes)
IT 7440-22-4, Silver, uses
RL: DEV (Device component use); USES (Uses)
(transversal mode monolithic multilayer piezoelec. actuatortransversal
mode monolithic multilayer piezoelec. actuator comprising metal
electrodes)

L29 ANSWER 16 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2003:258871 HCAPLUS
DN 138:247076
ED Entered STN: 04 Apr 2003
TI Laminated multilayer thick-film actuator
IN Zhu, Wei Guang; Yao, Kui; Chang, Kuan Teck; Yao, Xi; Yin, Qing Rui
PA Data Storage Institute, Singapore; Nanyang Technological University; Xian
Jiaotong University; Shanghai Institute of Ceramics
SO Singapore Pat. Appl., 25 pp.
CODEN: SGXXAI
DT Patent
LA English
IC ICM H01L041-24
ICS C04B035-64
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	SG 88736	A1	20020521	SG 1997-3488	19971107

PRAI SG 1997-3488 19971107
CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
SG 88736	ICM	H01L041-24
	ICS	C04B035-64
	IPCI	H01L0041-24 [ICM,7]; C04B0035-64 [ICS,7]
	IPCR	C04B0035-64 [I,A]; C04B0035-64 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]

AB A process for producing a multilayer actuator comprising the steps of: (a) forming alternate **piezoelec.** or **electrostrictive** ceramic **layers** and electrode layers on a **substrate** to form a laminate body comprising a plurality of **piezoelec.** or **electrostrictive** ceramic **layers** and a plurality of electrode layers, each **electrode** layer being interposed **between** 2 ceramic layers; (b) applying isostatic pressure to the laminate body; and (c) firing the laminate body.

ST ceramic laminated multilayer film electrode piezoelec actuator

IT Ceramic **coatings**
(in laminated thick-film piezoelec. actuator)

IT Piezoelectric actuators
(laminated multilayer thick-film)

IT Electrodes
(laminated multilayer thick-film piezoelec. actuator containing palladium-silver)

IT Multilayers
(laminated thick-film piezoelec. actuator)

IT Laminated materials
(multilayer thick-film piezoelec. actuator)

IT 1317-36-8, Lead monoxide, uses 12626-81-2, Lead titanate zirconate ($PbTi_{0-1}Zr_{0-1}O_3$)
RL: DEV (Device component use); USES (Uses)
(laminated multilayer thick-film piezoelec. actuator containing)

IT 12735-99-8
RL: DEV (Device component use); USES (Uses)
(laminated multilayer thick-film piezoelec. actuator containing electrodes of)

L29 ANSWER 17 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:774112 HCAPLUS
DN 137:319154
ED Entered STN: 11 Oct 2002
TI Piezoelectric components and ultrasound oscillation devices
IN Harada, Koichi; Hosono, Yasuharu; Kobayashi, Takeshi; Itsumi, Kazuhiro; Izumi, Mamoru; Yamashita, Yohachi
PA Toshiba Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-09
ICS H01L041-187; H04R017-00
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002299712	A2	20021011	JP 2001-94155	20010328
PRAI	JP 2001-94155		20010328		

CLASS

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 PATENT NO.        CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 2002299712     ICM    H01L041-09
                   ICS    H01L041-187; H04R017-00
                   IPCI   H01L0041-09 [ICM,7]; H01L0041-187 [ICS,7]; H01L0041-18
                          [ICS,7,C*]; H04R0017-00 [ICS,7]
                   IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18
                          [I,C*]; H01L0041-187 [I,A]; H04R0017-00 [I,A];
                          H04R0017-00 [I,C*]
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AB The components comprise a single crystal Pb(A,Nb)1-xTixO3 layer (A = Zn, Mg, Sc, In; x = 0-0.55) bound **between electrodes.** The electrodes formed on the title piezoelec. components contain 5.05-30.0 weight% Pb and/or Zn glass. The glass composition in the electrodes provides sufficient stress strength in prevention of break-down in dicing to give the piezoelec. components.

ST glass compn electrode piezoelec component dicing stress

IT **Epoxy** resins, properties
RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(acoustic matching **layer; piezoelec.** components and ultrasound oscillation devices)

IT Stress, mechanical
(dicing; piezoelec. components and ultrasound oscillation devices)

IT Synthetic rubber, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(ferrite, **substrates**; piezoelec. components and ultrasound oscillation devices)

IT Electrodes
(glass content in; piezoelec. components and ultrasound oscillation devices)

IT Glass, properties
RL: MOA (Modifier or additive use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(lead bismuth zinc borosilicate, in electrodes; piezoelec. components and ultrasound oscillation devices)

IT Sound and Ultrasound
(oscillators; piezoelec. components and ultrasound oscillation devices)

IT Piezoelectric materials
Piezoelectric transducers
(piezoelec. components and ultrasound oscillation devices)

IT Resonators
(piezoelec., ultrasound; piezoelec. components and ultrasound oscillation devices)

IT 7439-92-1, Lead, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses
RL: MOA (Modifier or additive use); USES (Uses)
(additive in glass; piezoelec. components and ultrasound oscillation devices)

IT 7440-22-4, Silver, properties
RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(glass-containing paste, for electrodes; piezoelec. components and ultrasound oscillation devices)

IT 151562-24-2, Lead magnesium niobium titanium oxide (PbMg0.23Nb0.45Ti0.32O3) 151862-30-5, Lead niobium titanium zinc oxide (PbNb0.61Ti0.09Zn0.3O3) 153039-90-8, Lead niobium scandium titanium oxide (PbNb0.29Sc0.29Ti0.42O3) 407635-93-2, Indium lead niobium titanium oxide In0.32PbNb0.32Ti0.36O3
RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(piezoelec.; piezoelec. components and ultrasound oscillation devices)

L29 ANSWER 18 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:388777 HCAPLUS
DN 136:378557
ED Entered STN: 24 May 2002
TI Piezoelectric thin-film components and fabrication of components thereof
IN Yamada, Akira; Maeda, Chisako; Miyashita, Shoji
PA Mitsubishi Electric Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-09
ICS H01L041-18; H01L041-187; H01L041-22; H03H003-02; H03H009-17
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002151754	A2	20020524	JP 2000-348009	20001115
PRAI	JP 2000-348009		20001115		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002151754	ICM	H01L041-09
	ICS	H01L041-18; H01L041-187; H01L041-22; H03H003-02; H03H009-17
	IPCI	H01L0041-09 [ICM,7]; H01L0041-18 [ICS,7]; H01L0041-187 [ICS,7]; H01L0041-22 [ICS,7]; H03H0003-02 [ICS,7]; H03H0003-00 [ICS,7,C*]; H03H0009-17 [ICS,7]; H03H0009-00 [ICS,7,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]; H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]

AB The title components comprise a 1st **piezoelec. layer**, a 2nd **piezoelec.** or dielec. **layer**, and electrodes. The fabrication involves **coating** the 2nd **piezoelec.** or dielec. **layer** on the 1st **piezoelec. layer** followed by heat-treating to give a 2nd **piezoelec**. or dielec. **interlayer** between the 1st **piezoelec. layer** and the **upper electrode**. The fabrication prevents elastic wave scattering, elec. loss, and characteristic deterioration.
ST **piezoelec** dielec **interlayer** thin film device elastic wave scattering
IT Wave
(elastic, scattering prevention; piezoelec. thin-film components and fabrication of components thereof)
IT Piezoelectric materials
Piezoelectric transducers
(piezoelec. thin-film components and fabrication of components thereof)
IT **Coating** materials
(**piezoelec.**/dielec. **interlayer**; **piezoelec**
. thin-film components and fabrication of components thereof)
IT Dielectric loss
(prevention of; piezoelec. thin-film components and fabrication of components thereof)
IT Electric insulators
(sintered **interlayer**; **piezoelec.** thin-film

components and fabrication of components thereof)
IT 12033-89-5, Silicon nitride, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(dielec. film; piezoelec. thin-film components and fabrication of components thereof)
IT 7440-06-4, Platinum, processes 7440-32-6, Titanium, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(electrode; piezoelec. thin-film components and fabrication of components thereof)
IT 1314-13-2, Zinc oxide, properties 11115-71-2, Bismuth titanate
12030-85-2, Niobium potassium oxide (NbKO3) 12031-63-9, Lithium niobate
12031-66-2, Lithium tantalate 12047-27-7, Barium titanate, properties
12060-00-3, Lead titanate 12626-81-2, Lead titanate zirconate
24304-00-5, Aluminum nitride
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**piezoelec. interlayer; piezoelec.** thin-film components and fabrication of components thereof)
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(single crystalline **substrate**; piezoelec. thin-film components and fabrication of components thereof)

L29 ANSWER 19 OF 37 HCAPLUS
AN 2002:183897 HCAPLUS
DN 136:240195
ED Entered STN: 15 Mar 2002
TI Completely bonded piezoelectric/**electrostrictive** sensors and actuators
IN Yamaguchi, Hirofumi; Takahashi, Nobuo
PA NGK Insulators, Ltd., Japan
SO Eur. Pat. Appl., 9 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H01L041-08
ICS H01L041-187
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1187234	A2	20020313	EP 2001-307651	20010910
	EP 1187234	A3	20040901		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2002094135	A2	20020329	JP 2000-275137	20000911
	JP 3465675	B2	20031110		
	US 2002070639	A1	20020613	US 2001-948077	20010906
	US 6495945	B2	20021217		
PRAI	JP 2000-275137	A	20000911		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1187234	ICM	H01L041-08
	ICS	H01L041-187
	IPCI	H01L0041-08 [ICM,6]; H01L0041-187 [ICS,6]; H01L0041-18 [ICS,6,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]

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                    ECLA   H01L041/09G
 JP 2002094135      IPCI   H01L0041-09 [ICM,7]; G01P0015-09 [ICS,7]; H01L0041-187
                           [ICS,7]; H01L0041-18 [ICS,7,C*]; H02N0002-00 [ICS,7]
                    IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]
 US 2002070639      IPCI   H01L0041-04 [ICM,7]; H01L0041-00 [ICM,7,C*]
                    IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]
                    NCL    310/330.000
                    ECLA   H01L041/09G
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AB The piezoelec./**electrostrictive** apparatus consists of completely bonded laminated layers. A ceramic **substrate** comprises a thin diaphragm portion and a thick portion. A **lower electrode** is formed on the ceramic **substrate** and is spaced apart from an auxiliary electrode, also formed on the ceramic **substrate.** A bonding layer comprises an insulator and is formed on the ceramic **substrate** between the **lower** and auxiliary **electrodes.** A **piezoelec./ electrostrictive layer** is formed on at least a portion of each of the **lower electrode**, the auxiliary **electrode** and the bonding layer. An **upper electrode** extends over the **piezoelec./ electrostrictive layer** and contacts the auxiliary electrode. A bonded portion exist wherein the bonding layer serves to completely bond together the **substrate** and the **piezoelec ./electrostrictive** film **layer.**

ST lamination joining piezoelec **electrostrictive** ceramic sensor actuator

IT **Electrostriction**
   (apparatus; completely bonded piezoelec./**electrostrictive** sensors and actuators)

IT Electrodes
   (auxiliary; completely bonded piezoelec./**electrostrictive** sensors and actuators)

IT Dielectric films
Electrodes
Joining
Lamination
Membranes, nonbiological
Piezoelectric actuators
Piezoelectric sensors
   (completely bonded piezoelec./**electrostrictive** sensors and actuators)

IT Glass, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
   (completely bonded piezoelec./**electrostrictive** sensors and actuators)

IT Ceramics
   (**substrates**; completely bonded piezoelec./ **electrostrictive** sensors and actuators)

IT 12057-57-7, Lead magnesium niobium oxide (PbMg0.33Nb0.67O3) 12060-00-3, Lead titanium oxide (PbTiO3) 12060-01-4, Lead zirconium oxide (PbZrO3) 12233-00-0, Bismuth sodium titanium oxide (Bi0.5Na0.5TiO3) 152633-92-6, Lead nickel niobium oxide (PbNi0.33Nb0.67O3) 402937-13-7 402937-14-8
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
   (completely bonded piezoelec./**electrostrictive** sensors and actuators)

L29 ANSWER 20 OF 37 INSPEC (C) 2006 IET on STN
AN 2003:7735560 INSPEC DN A2003-21-6855-029; B2003-10-0520B-024

TI Synthesis of c-axis oriented AlN thin films on metal layers: Al, Mo, Ti, TiN and Ni

AU Iriarte, G.F.; Bjurstrom, J.; Westlinder, J.; Engelmark, F.; Katardjiev, I.V. (Angstrom Lab., Uppsala Univ., Sweden)

SO 2002 IEEE Ultrasonics Symposium. Proceedings (Cat. No.02CH37388), vol.1, 2002, p. 311-15 vol.1 of 2 vol.1996 pp., 7 refs., Also available on CD-ROM in PDF format
Editor(s): Yuhas, D.E.; Schneider, S.C.
ISBN: 0 7803 7582 3
Price: 0-7803-7582-3/02/$17.00
Published by: IEEE, Piscataway, NJ, USA
Conference: Proceedings of 2002 IEEE International Ultrasonics Symposium, Munich, Germany, 8-11 Oct. 2002
Sponsor(s): Ultransonics; Ferroelectr., & Frequency Control Soc

DT Conference; Conference Article

TC Application; Experimental

CY United States

LA English

AB Thin piezoelectric polycrystalline films such as AlN, ZnO, etc are of great interest for the fabrication of Thin Film Bulk/Surface Acoustic Resonators (TFBAR) or (TFSAR). It is well known that the degree of c-axis orientation of the thin films correlates directly with the electro-mechanical coupling. The texture of the piezoelectric films in turn is influenced by the structure of the **substrate** material.
Thin AlN films, prepared in a magnetron sputtering system, have been deposited onto thin Al, Mo, Ni, Ti and TiN films. Such thin metal layers are used to form the **bottom electrode** of TFBAR as well as to define a short-circuiting plane in TFSAR devices. In both cases, they serve as a **substrate** for the growth of the piezoelectric film. It has been found that the texture of the bottom metal layer affects significantly the texture of the AlN films, and hence its electroacoustic properties. For this reason, the surface morphology and texture of the metal layers and their influence on the growth of AlN on them has been systematically studied. Thus, the texture and the electro-acoustic properties of the AlN films have been studied as a function of the texture and morphology of the underlying metal films. Subsequently, the deposition processes have been individually optimised with respect to obtaining high electromechanical coupling for all thin film combinations

CC A6855 Thin film growth, structure, and epitaxy; A7755 Dielectric thin films; A7760 Piezoelectricity and electrostriction; A8115C Deposition by sputtering; A6820 Solid surface structure; B0520B Sputter deposition; B2810F Piezoelectric and ferroelectric materials; B2860C Acoustic wave devices; B2520D II-VI and III-V semiconductors

CT aluminium; aluminium compounds; III-V semiconductors; molybdenum; nickel; piezoelectric semiconductors; piezoelectric thin films; semiconductor growth; semiconductor thin films; sputtered **coatings**; surface acoustic wave resonators; surface morphology; surface texture; surface topography; titanium; titanium compounds; wide band **gap** semiconductors

ST c-axis oriented AlN thin films; metal layers; electro-mechanical coupling; piezoelectric films; substrate material; magnetron sputtering; TFBAR; TFSAR; Thin Film Bulk/Surface Acoustic Resonators; bottom metal layer; texture; electroacoustic properties; morphology; AlN; Al; Mo; Ti; TiN; Ni

CHI AlN int, Al int, N int, AlN bin, Al bin, N bin; Al sur, Al el; Mo sur, Mo el; Ti sur, Ti el; TiN sur, Ti sur, N sur, TiN bin, Ti bin, N bin; Ni sur, Ni el

ET V; Al*N; AlN; Al cp; cp; N cp; N; Al; Mo; Ti; N*Ti; TiN; Ti cp; Ni; O*Zn; ZnO; Zn cp; O cp

L29 ANSWER 21 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:392128 HCAPLUS
DN 134:375033
ED Entered STN: 31 May 2001
TI Encapsulated thin-film resonator with high Q and improved performance and fabrication method using diffusion barrier
IN Lakin, Kenneth Meade
PA TFR Technologies, Inc., USA
SO U.S., 8 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01L041-04
INCL 310364000
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	US 6239536	B1	20010529	US 1998-149319	19980908
PRAI	US 1998-149319		19980908		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6239536	ICM	H01L041-04
	INCL	310364000
	IPCI	H01L0041-04 [ICM,7]; H01L0041-00 [ICM,7,C*]
	IPCR	H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	NCL	310/364.000
	ECLA	H03H003/02; H03H009/02B8N; H03H009/17A; H03H009/17A1

AB A thin-film piezoelec. resonator and method of fabrication that includes a barrier layer of material **between** the underlying **electrode** and a **layer** of **piezoelec.** material. For example, in a resonator that uses Zn oxide for the **layer** of **piezoelec.** material, a barrier **layer** of Al nitride is deposited upon an underlying Al electrode to protect the Al electrode from oxidation or structural deformation during the subsequent deposition of the **piezoelec. layer** of Zn oxide. The barrier layer of Al nitride is deposited in a manner so as to provide a **substrate** having a substantial degree of uniformity of crystal orientation upon which the **layer** of **piezoelec.** material may then be deposited in a manner such that the **piezoelec. layer** will, itself, also have a substantial degree of uniformity in the orientations of its crystals. The resonator includes a 2nd **electrode** deposited upon the **upper** surface of the piezoelec. material or upon the upper surface of a 2nd barrier layer of Al nitride that is deposited upon the upper surface of the **piezoelec . layer.**
ST piezoelec resonator diffusion barrier fabrication
IT **Coating** process
Diffusion barrier
Electric contacts
Electronic device fabrication
Piezoelectric materials
Potting
Resonators
(encapsulated thin-film resonator with high Q and improved performance and fabrication method using diffusion barrier)
IT Resonators

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        (piezoelec.; encapsulated thin-film resonator with high Q and improved
        performance and fabrication method using diffusion barrier)
IT   1314-13-2, Zinc oxide, processes   7429-90-5, Aluminum, processes
     24304-00-5, Aluminum nitride
     RL: DEV (Device component use); PEP (Physical, engineering or chemical
     process); PROC (Process); USES (Uses)
        (encapsulated thin-film resonator with high Q and improved performance
        and fabrication method using diffusion barrier)
RE.CNT  7     THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; CRC Handbook of Chemistry and Physics, College Edition 50th Edition
    PB-153
(2) Ceramic Industry; 1997, V147(1), P151
(3) Lakin; IEEE MTT-S Digest 1993, P1517
(4) Mikoshiba; US 4511816 1985
(5) Pradal; US 5760663 1998
(6) Sze, S; Physics of Semiconductor Devices, 2nd Ed P852
(7) Utumi; US 5571603 1996 HCAPLUS

L29  ANSWER 22 OF 37  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN   2001:778388  HCAPLUS
DN   135:338047
ED   Entered STN:  26 Oct 2001
TI   Manufacture of piezoelectric components and ink jet recording heads
IN   Kamei, Hiroyuki
PA   Seiko Epson Corp., Japan
SO   Jpn. Kokai Tokkyo Koho, 9 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  H01L041-22
     ICS  B41J002-16; B41J002-045; B41J002-055; C04B035-49; H01L041-09;
          H01L041-18
CC   76-7 (Electric Phenomena)
     Section cross-reference(s): 57
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   JP 2001298222        A2    20011026   JP 2000-114307         20000414
PRAI JP 2000-114307             20000414
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 2001298222   ICM    H01L041-22
                 ICS    B41J002-16; B41J002-045; B41J002-055; C04B035-49;
                        H01L041-09; H01L041-18
                 IPCI   H01L0041-22 [ICM,7]; B41J0002-16 [ICS,7]; B41J0002-045
                        [ICS,7]; B41J0002-055 [ICS,7]; C04B0035-49 [ICS,7];
                        H01L0041-09 [ICS,7]; H01L0041-18 [ICS,7]
                 IPCR   B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055
                        [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A];
                        B41J0002-16 [I,C*]; C04B0035-49 [I,A]; C04B0035-49
                        [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*];
                        H01L0041-18 [I,A]; H01L0041-18 [I,C*]; H01L0041-22
                        [I,A]; H01L0041-22 [I,C*]
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AB   The title manufacturing involves forming a **lower electrode** on a **substrate**, **coating** organometallic sol on the **lower electrode**, gelating the sol, crystallizing the gelated organometallic gel **layer** to give a **piezoelec.** film on the **lower electrode**, and forming an **upper**

electrode on the piezoelec. film, wherein process for gelating the sol involves drying the coated sol layer and degreasing the dried sol by heating , wherein the drying process involves placing the substrate tightly on a hot plate. The process provides the manufacturing evenly formed piezoelec. coated gel crystallization
ST hot plate heating piezoelec organometallic sol gellation drying crystn
IT Degreasing
Drying
(by heating; manufacture of piezoelec. components and ink jet recording heads)
IT Heating
(by hot plate; manufacture of piezoelec. components and ink jet recording heads)
IT Magnetic recording heads
(ink jet; manufacture of piezoelec. components and ink jet recording heads)
IT Piezoelectric materials
(manufacture of piezoelec. components and ink jet recording heads)
IT Crystallization
(of organometallic sol; manufacture of piezoelec. components and ink jet recording heads)
IT Gelation
(of sol layer; manufacture of piezoelec. components and ink jet recording heads)
IT Coating materials
(organometallic sol; manufacture of piezoelec. components and ink jet recording heads)
IT 7440-06-4, Platinum, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(electrode; manufacture of piezoelec. components and ink jet recording heads)
IT 106699-87-0P, Lead titanium zirconium oxide (PbTi0.44Zr0.56O3)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); PROC (Process); USES (Uses)
(piezoelec. film, formation by crystallization of sol and gel; manufacture of
piezoelec. components and ink jet recording heads)
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(substrate; manufacture of piezoelec. components and ink jet recording heads)

L29 ANSWER 23 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:770964 HCAPLUS
ED Entered STN: 24 Oct 2001
TI Piezoelectric/electrostrictive film type elements and process for producing the same
IN Takeuchi, Yukihisa; Nanataki, Yukihisa; Kimura, Koji; Takahasi, Masao
PA Ngk Insulators, Ltd., Japan
SO Eur. Pat. Appl.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H01L041-09
ICS H01L041-24
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1148561	A2	20011024	EP 2001-303594	20010419
	EP 1148561	A3	20040616		

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        R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
            IE, SI, LT, LV, FI, RO
     JP 2002009359       A2     20020111    JP 2001-119303          20010418
     US 2002014816       A1     20020207    US 2001-837546          20010418
     US 6518690          B2     20030211
     US 2003033700       A1     20030220    US 2002-236754          20020906
     US 6703257          B2     20040309
PRAI JP 2000-118030      A      20000419
     US 2001-837546      A3     20010418
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 EP 1148561      ICM    H01L041-09
                 ICS    H01L041-24
                 IPCI   H01L0041-09 [ICM,6]; H01L0041-24 [ICS,6]
                 IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24
                        [I,A]; H01L0041-24 [I,C*]
                 ECLA   H01L041/09G; H01L041/24
 JP 2002009359   IPCI   H01L0041-09 [ICM,7]; G01L0001-16 [ICS,7]; H01L0041-187
                        [ICS,7]; H01L0041-18 [ICS,7,C*]; H01L0041-22 [ICS,7]
                 IPCR   G01L0001-16 [I,A]; G01L0001-16 [I,C*]; H01L0041-09
                        [I,A]; H01L0041-09 [I,C*]; H01L0041-18 [I,C*];
                        H01L0041-187 [I,A]; H01L0041-22 [I,A]; H01L0041-22
                        [I,C*]
 US 2002014816   IPCI   H01L0041-04 [ICM,7]; H01L0041-00 [ICM,7,C*]
                 IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24
                        [I,A]; H01L0041-24 [I,C*]
                 NCL    310/358.000
                 ECLA   H01L041/09G; H01L041/24
 US 2003033700   IPCI   H04R0017-00 [ICM,7]; H05K0003-02 [ICS,7]
                 IPCR   H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24
                        [I,A]; H01L0041-24 [I,C*]
                 NCL    029/025.350
                 ECLA   H01L041/09G; H01L041/24
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AB An integrated piezoelec./**electrostrictive** film type element with excellent durability, includes a **substrate** made of a ceramic material composed mainly of completely stabilized or partially stabilized zirconium oxide, and a piezoelec./**electrostrictive** operating section integrated onto the ceramic **substrate** by a film-forming method, the piezoelec./**electrostrictive** operating section comprising a **lower electrode**, a **piezoelec./ electrostrictive layer** of a lead element-containing composition, and an **upper electrode**, wherein a heterophase-occurrence rate at a surface of the **piezoelec./ electrostrictive layer** is controlled to a range of 0.1 to 30%.

L29 ANSWER 24 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:305609 HCAPLUS
DN 132:302074
ED Entered STN: 11 May 2000
TI Acoustic resonators and their manufacture
IN Ruby, Richard C.; Desai, Yogesh; Bradbury, Donald R.
PA Hewlett-Packard Company, USA
SO U.S., 8 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01L041-08
INCL 310363000

CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6060818	A	20000509	US 1998-88964	19980602
PRAI	US 1998-88964		19980602		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6060818	ICM	H01L041-08
	INCL	310363000
	IPCI	H01L0041-08 [ICM,7]
	IPCR	H03H0009-00 [I,C*]; H03H0009-17 [I,A]
	NCL	310/363.000; 029/025.350; 310/349.000
	ECLA	H03H009/17A1A; H03H009/58F2S

AB A resonator includes a **layer** of **piezoelec.** material sandwiched **between** 1st and 2nd **electrodes.** The 1st electrode includes a conducting sheet having a root-mean-square variation in height of <2 μm. The resonator bridges a cavity in a **substrate** on which the resonator is constructed. The resonator is constructed by creating a cavity in the **substrate** and filling it with a sacrificial material that can be rapidly removed from the cavity after the deposition of the various layers making up the resonator. The surface of the filled cavity is polished to provide a root-mean-square variation in height of <0.5 μm. The 1st electrode is deposited on the polished surface to a thickness that assures that the root-mean-square variation in height of the metallic layer is <2 μm. The **piezoelec. layer** is deposited on the 1st electrode and the 2nd electrode is then deposited on the **piezoelec. layer.** The sacrificial material is then removed from the cavity by opening vias into the cavity and removing the material through the vias. The preferred sacrificial material is phosphosilicate glass.

ST acoustic resonator manuf; piezoelec resonator manuf

IT Resonators
(acoustic; manufacture of piezoelec. acoustic resonators)

IT Polishing
(in manufacture of piezoelec. acoustic resonators)

IT Piezoelectric materials
(manufacture of acoustic resonators containing)

IT Resonators
(piezoelec.; manufacture of piezoelec. acoustic resonators)

IT **Vinyl** compounds, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(**polymers**, sacrificial material; in manufacture of piezoelec. acoustic resonators)

IT Borophosphosilicate glasses
Phosphosilicate glasses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(sacrificial material; in manufacture of piezoelec. acoustic resonators)

IT Glass, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(spin on, sacrificial material; in manufacture of piezoelec. acoustic resonators)

IT 7439-98-7, Molybdenum, processes 24304-00-5, Aluminum nitride (AlN)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(manufacture of acoustic resonators containing)

IT 9003-07-0, Polypropylene 9003-53-6, Polystyrene
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(sacrificial material; in manufacture of piezoelec. acoustic resonators)
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Ruby; US 5587620 1996 HCAPLUS
(2) Ruby; US 5873153 1999 HCAPLUS

L29 ANSWER 25 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:43229 HCAPLUS
DN 132:101597
ED Entered STN: 18 Jan 2000
TI Piezoelectric actuators
IN Yamanaka, Kunihiro; Akiyama, Zenichi
PA Ricoh Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM B41J002-045
ICS B41J002-055; B41J002-16; H01L041-09; H01L041-24
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000015809	A2	20000118	JP 1998-190266	19980706
PRAI	JP 1998-190266		19980706		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2000015809	ICM	B41J002-045
	ICS	B41J002-055; B41J002-16; H01L041-09; H01L041-24
	IPCI	B41J0002-045 [ICM,7]; B41J0002-055 [ICS,7]; B41J0002-16 [ICS,7]; H01L0041-09 [ICS,7]; H01L0041-24 [ICS,7]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]

AB The actuators comprise Si **substrates**, piezoelec./ **electrostriction** driving parts, ≥1 intermediate layers which contain Ta 1st layers and Ta nitride 2nd layers, Pt-Rh alloy **bottom electrode layers, piezoelec. layers**, and to electrode layers. The actuators are cable of high integration, and free of the peeling of electrode layers, and prevent deterioration of piezoelec. characteristic.
ST piezoelec actuator silicon tantalum nitride; platinum rhodium electrode piezoelec actuator
IT Piezoelectric actuators
(piezoelec. actuators with Si **substrates** and Ta-based intermediate layers)
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(piezoelec. actuators with Si **substrates**)
IT 11107-71-4, Platinum, rhodium
RL: DEV (Device component use); USES (Uses)
(piezoelec. actuators with Si **substrates** and **bottom electrode** layers from)
IT 7440-25-7, Tantalum, uses 12033-62-4, Tantalum nitride
RL: DEV (Device component use); USES (Uses)

(piezoelec. actuators with Si **substrates** and intermediate layers from)

L29 ANSWER 26 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:678132 HCAPLUS
ED Entered STN: 01 Aug 2005
TI Manufacturing method for light modulation device
IN Kim, Jeong Sam
PA Daewoo Electronics Co.,ltd, S. Korea
SO Repub. Korea, No pp. given
CODEN: KRXXFC
DT Patent
LA Korean
IC ICM G02F001-015
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	KR 179621	B1	19990501	KR 1994-34981	19941219
PRAI	KR 1994-34981		19941219		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
KR 179621	ICM	G02F001-015
	IPCI	G02F0001-015 [ICM,7]; G02F0001-01 [ICM,7,C*]
	IPCR	G02F0001-01 [I,C*]; G02F0001-015 [I,A]

AB PURPOSE: A method of fabricating an optical path adjustment apparatus is provided to form a sacrificial layer as **polymer** thereby removing the sacrificial layer with a high selectivity to a metal layer or a ceramic material layer. CONSTITUTION: The method of fabricating an optical path adjustment apparatus comprises the steps of: forming a **polymer** layer on the whole area of a matrix **substrate** (10) on which a signal electrode pad(12) provided and exposing the signal electrode pad(12) by partially etching the **polymer** layer; forming a metal layer on the whole area of the **substrate** to form a **lower electrode**(22); forming a **piezoelectric** material **layer** on the upper side of the metal layer; forming a metal layer on the whole area of the **piezoelectric** material **layer** to form an **upper electrode**(26); etching the **lower** metal **layer**(22), the **piezoelectric** material **layer**, and the upper metal layer(26) to divide elements.

L29 ANSWER 27 OF 37 INSPEC (C) 2006 IET on STN
AN 2000:6703123 INSPEC DN B2000-10-2860C-049
TI The influence of ZnO and electrode thickness on the performance of thin film bulk acoustic wave resonators
AU Osbond, P.; Beck, C.M.; Brierley, C.J.; Cox, M.R.; Marsh, S.P.; Shorrocks, N.M. (Marconi Mater. Technol., Towester, UK)
SO 1999 IEEE Ultrasonics Symposium. Proceedings. International Symposium (Cat. No.99CH37027), vol.2, 1999, p. 911-14 vol.2 of 2 vol. 1760 pp., 1 refs.
Editor(s): Schneider, S.C.; Levy, M.; McAvoy, B.R.
ISBN: 0 7803 5722 1
Price: 0 7803 5722 1/99/$10.00
Published by: IEEE, Piscataway, NJ, USA
Conference: 1999 IEEE Ultrasonics Symposium. Proceedings. International Symposium, Caesars Tahoe, NV, USA, 17-20 Oct. 1999
Sponsor(s): Ultrasonics, Ferroelectr., & Frequency Control Soc
DT Conference; Conference Article
TC Experimental

CY United States
LA English
AB Thin film bulk acoustic resonator (FEAR) structures have been fabricated by RF magnetron sputtering of **piezoelectric** ZnO **layers** onto silicon. Deposition at a range of different temperatures has been performed and the films were assessed using XRD, SEM and electrical characterization. A range of ZnO film thicknesses were deposited and a good correlation was obtained between the theoretical and measured resonant frequencies. The effect of **top** and **bottom electrode** thickness on the performance of the device is also reported, with specific reference to resonant frequency and Q-value. Wafer scale fabrication of devices has been carried out and excellent yields obtained on 76 mm wafers. Devices exhibiting resonant frequencies in excess of 2 GHz are reported and the prospects for manufacturing passband filters based on FBAR resonators are discussed
CC B2860C Acoustic wave devices; B2810F Piezoelectric and ferroelectric materials; B0520B Sputter deposition
CT acoustic resonators; bulk acoustic wave devices; piezoelectric thin films; Q-factor; sputtered **coatings**; zinc compounds
ST electrode thickness; thin film bulk acoustic wave resonator; RF magnetron sputtering; ZnO piezoelectric layer; silicon substrate; XRD; SEM; electrical characteristics; resonant frequency; Q-factor; wafer scale fabrication; passband filter; FBAR resonator; 76 mm; 2 GHz; ZnO
CHI ZnO bin, Zn bin, O bin
PHP size 7.6E-02 m; frequency 2.0E+09 Hz
ET O; Zn; O*Zn; ZnO; Zn cp; cp; O cp

L29 ANSWER 28 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:251336 HCAPLUS
DN 128:316169
ED Entered STN: 02 May 1998
TI Resonator having an acoustic mirror
IN Ylilammi, Markku; Partanen, Meeri
PA Nokia Mobile Phones Limited, Finland; Nokia Mobile Phones Inc.
SO PCT Int. Appl., 35 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01L041-08
CC 76-7 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9816957	A1	19980423	WO 1997-US16233	19970912
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW				
	RW: GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	US 5873154	A	19990223	US 1996-733177	19961017
	EP 1012889	A1	20000628	EP 1997-941067	19970912
	R: DE, FR, GB				
PRAI	US 1996-733177	A	19961017		
	WO 1997-US16233	W	19970912		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES

```
 WO 9816957       ICM    H01L041-08
                  IPCI   H01L0041-08 [ICM,6]
                  IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                         [I,C*]; H03H0009-17 [I,A]
                  ECLA   H03H003/02; H03H009/17A1C
 US 5873154       IPCI   H01L0041-22 [ICM,6]
                  IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                         [I,C*]; H03H0009-17 [I,A]
                  NCL    029/025.350; 310/324.000; 310/334.000; 427/100.000
                  ECLA   H03H003/02; H03H009/17A1C
 EP 1012889       IPCI   H01L0041-08 [ICM,6]
                  IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                         [I,C*]; H03H0009-17 [I,A]
                  ECLA   H03H003/02; H03H009/17A1C
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AB A thin-film bulk acoustic wave resonator (FBAR) comprises a **top electrode** layer, a **substrate**, an acoustic mirror formed on the **substrate**, and a **piezoelec. layer** formed **between** the **top electrode** layer and the acoustic mirror. The acoustic mirror is comprised of a plurality of stacked layers. One of the stacked layers forms a **bottom electrode** layer. At least another of the stacked layers comprises a **polymer.** The **piezoelec. layer** produces vibrations in response to a voltage being applied **between** the **top electrode** and the **bottom electrode** . The acoustic mirror acoustically isolates these vibrations from the **substrate.** The **polymer** is preferably an electronic grade **polymer** and has the capability of withstanding the deposition of the **piezoelec. layer** at an elevated temperature The layers forming the acoustic mirror which do not comprise the **polymer** comprise a high-acoustic-impedance material, e.g. W. The **polymer** can be spun on the **substrate** during fabrication of the FBAR.

ST film bulk acoustic wave resonator mirror

IT Mirrors
  (acoustic; thin-film bulk acoustic wave resonator having)

IT Resonators
  (piezoelec.; thin-film bulk acoustic wave resonator having acoustic mirror)

IT Glass **substrates**
Piezoelectric materials
  (thin-film bulk acoustic wave resonator having acoustic mirror containing)

IT Polyimides, uses
Polymers, uses
RL: DEV (Device component use); USES (Uses)
  (thin-film bulk acoustic wave resonator having acoustic mirror containing)

IT 1303-00-0, Gallium arsenide, uses 1314-13-2, Zinc oxide (ZnO), uses 7440-21-3, Silicon, uses 7440-33-7, Tungsten, uses 7631-86-9, Silica, uses 24304-00-5, Aluminum nitride (AlN) 124221-30-3, Cyclotene
RL: DEV (Device component use); USES (Uses)
  (thin-film bulk acoustic wave resonator having acoustic mirror containing)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bhardwaj; US 5332943 A 1994
(2) Krishnaswamy; US 5185589 A 1993
(3) Sudol; US 5629906 A 1997

L29 ANSWER 29 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:251335 HCAPLUS
DN 128:316168
ED Entered STN: 02 May 1998

```
TI   Fabricating thin-film bulk acoustic wave resonators (FBARs) on glass
     substrates
IN   Ylilammi, Markku; Partanen, Meeri
PA   Nokia Mobile Phones Limited, Finland; Nokia Mobile Phones Inc.
SO   PCT Int. Appl., 32 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  H01L041-08
CC   76-7 (Electric Phenomena)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 9816956           A1    19980423   WO 1997-US16231        19970912
         W:  AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE,
             DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR,
             KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ,
             PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG,
             UZ, VN, YU, ZW
         RW: GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR,
             GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA,
             GN, ML, MR, NE, SN, TD, TG
     AU 9742700           A1    19980511   AU 1997-42700          19970912
     EP 1012888           A1    20000628   EP 1997-941066         19970912
         R:  DE, FR, GB, IT
     JP 2002509644        T2    20020326   JP 1998-518344         19970912
     US 2003102773        A1    20030605   US 2002-278612         20021022
     US 6839946           B2    20050111
PRAI US 1996-734467       A     19961017
     WO 1997-US16231      W     19970912
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 9816956      ICM    H01L041-08
                 IPCI   H01L0041-08 [ICM,6]
                 IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                        [I,C*]; H03H0009-17 [I,A]
                 ECLA   H03H003/02; H03H009/17A1A
 AU 9742700      IPCI   H01L0041-08 [ICM,6]
                 IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                        [I,C*]; H03H0009-17 [I,A]
                 ECLA   H03H003/02; H03H009/17A1A
 EP 1012888      IPCI   H01L0041-08 [ICM,6]
                 IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                        [I,C*]; H03H0009-17 [I,A]
                 ECLA   H03H003/02; H03H009/17
 JP 2002509644   IPCI   H01L0041-09 [ICM,7]; H01L0041-22 [ICS,7]; H03H0003-02
                        [ICS,7]; H03H0003-00 [ICS,7,C*]; H03H0009-17 [ICS,7];
                        H03H0009-00 [ICS,7,C*]
                 ECLA   H03H003/02; H03H009/17A1A
 US 2003102773   IPCI   H04R0017-00 [ICM,7]; H01L0041-04 [ICS,7]; H01L0041-00
                        [ICS,7,C*]; H01L0041-08 [ICS,7]; H01L0041-18 [ICS,7]
                 IPCR   H03H0003-00 [I,C*]; H03H0003-02 [I,A]; H03H0009-00
                        [I,C*]; H03H0009-17 [I,A]
                 NCL    310/311.000
                 ECLA   H03H003/02; H03H009/17; H03H009/17A1A
AB   The method comprises: (A) forming a sacrificial layer comprising a metal
     or a polymer over a selected portion of a substrate;
     (B) forming a protective layer on the sacrificial layer and on selected
     portions of the substrate; (C) forming a bottom
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electrode layer on a selected portion of the protective **layer**; (D) forming a **piezoelec. layer** on a selected portion of the protective layer; (E) forming a **top electrode** on a selected portion of the **piezoelec. layer**; and (F) removing the sacrificial layer to form an air **gap**. The use of a metal or **polymer** to form sacrificial layers has several advantages over the use of ZnO to form such layers. In accordance with a further aspect of the invention, an FBAR is provided which includes a glass **substrate**. The use of glass to form **substrates** offers several advantages over the use of other materials. For example, most types of glass are less expensive than semiconductor materials, and exhibit low permittivity and low parasitic capacitance. Most glass materials are substantially loss free when being used in microwave-frequency applications.

ST film bulk acoustic wave resonator manuf; glass **substrate** acoustic wave resonator manuf

IT Glass **substrates**
(fabricating thin-film bulk acoustic wave resonators (FBARs) on)

IT **Coating** materials
Piezoelectric materials
(fabricating thin-film bulk acoustic wave resonators (FBARs) on glass **substrates** containing)

IT Metals, processes
Polymers, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabricating thin-film bulk acoustic wave resonators (FBARs) on glass **substrates** containing)

IT Etching
(in fabricating thin-film bulk acoustic wave resonators (FBARs) on glass **substrates**)

IT Resonators
(piezoelec.; fabricating thin-film bulk acoustic wave resonators (FBARs) on glass **substrates**)

IT 1314-13-2, Zinc oxide (ZnO), processes 7440-50-8, Copper, processes 7631-86-9, Silica, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabricating thin-film bulk acoustic wave resonators (FBARs) on glass **substrates** containing)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Dydyk; US 5596239 A 1997 HCAPLUS
(2) Mariani; US 5162691 A 1992 HCAPLUS
(3) Suzuki; US 4642508 A 1987

L29 ANSWER 30 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:590614 HCAPLUS
DN 129:237692
ED Entered STN: 17 Sep 1998
TI Process for preparation of ink-jet printer head
IN Shimada, Masato; Hasegawa, Kazumasa
PA Seiko Epson Corp., Japan
SO U.S., 20 pp., Division of U.S. Ser. No. 627,065.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01L041-22
ICS G01D015-20
INCL 029025350

CC 74-6 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5802686	A	19980908	US 1997-859370	19970520
	JP 2004195994	A2	20040715	JP 2004-109355	20040401
	JP 3734176	B2	20060111		
PRAI	JP 1995-77634	A	19950403		
	JP 1996-7217	A	19960119		
	US 1996-627065	A3	19960403		
	JP 1996-81751	A3	19960403		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5802686	ICM	H01L041-22
	ICS	G01D015-20
	INCL	029025350
	IPCI	H01L0041-22 [ICM,6]; G01D0015-20 [ICS,6]
	IPCR	B41J0002-14 [I,A]; B41J0002-14 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]
	NCL	029/025.350; 029/890.100; 216/027.000; 252/062.900PZ; 310/365.000; 347/070.000
	ECLA	B41J002/14D2; B41J002/16D2; H01L041/09G
JP 2004195994	IPCI	B41J0002-045 [I,A]; B41J0002-055 [I,A]; B41J0002-16 [I,A]
	IPCR	B41J0002-045 [I,A]; B41J0002-045 [I,C*]; B41J0002-055 [I,A]; B41J0002-055 [I,C*]; B41J0002-16 [I,A]; B41J0002-16 [I,C*]

AB A printer head for ink-jet recording is disclosed, comprising a single-crystal silicon **substrate** pierced with holes, a zirconium oxide layer which is brought into direct contact with the surface of the silicon **substrate** or a silicon oxide layer on the surface of the silicon **substrate** so as to cover one end of the holes in the silicon **substrate**, a **lower electrode** provided on the zirconium oxide **layer**, a **piezoelec. layer** provided on the **lower electrode**, and an **upper electrode** provided on the **piezoelec. layer**. A process for the preparation of the above printer head for ink-jet recording is also disclosed. The printer head for ink-jet recording can support a piezoelec. substance having a high piezoelectricity, can exhibit a high head drive durability, and can be produced in a high yield.

ST ink jet printer head piezoelec element

IT Piezoelectric transducers
   (for ink-jet printer heads)

IT Ink-jet printers
   (printing heads; with piezoelec. elements)

IT 12057-57-7, Lead magnesium niobium oxide ($PbMg_{0.33}Nb_{0.67}O_3$) 12060-00-3, Lead titanium oxide ($PbTiO_3$) 12060-01-4, Lead zirconium oxide ($PbZrO_3$)
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
   (ink-jet printer heads with piezoelec. elements containing)

IT 1314-23-4, Zirconium oxide, uses 7631-86-9, Silica, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
   (ink-jet printer heads with silicon **substrates coated** with)

IT 7440-21-3, Silicon, uses

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(ink-jet printer heads with **substrates** of)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Akiyama; US 5555219 1996 HCAPLUS
(2) Anon; EP 0606767 1994 HCAPLUS
(3) Anon; JP 6297720 1994
(4) Anon; EP 0636593 1995 HCAPLUS
(5) Drake; US 4789425 1988
(6) Hoisington; US 5265315 1993 HCAPLUS
(7) Inamoto; US 4609427 1986 HCAPLUS
(8) Sandbach; US 5493320 1996
(9) Seiko Epson Corp; JP A06297720 1994
(10) Takeuchi; US 5376875 1994

L29 ANSWER 31 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1997:399927 HCAPLUS
DN 127:43542
ED Entered STN: 28 Jun 1997
TI Piezoelectric/**electrostriction** film devices for sensing, filtering, and noise eliminating
IN Takeuchi, Yukihisa; Kimura, Koji; Nanataki, Tsutomu
PA NGK Insulators, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-08
ICS G01L001-16; H04R017-00
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09107132	A2	19970422	JP 1995-265160	19951013
	JP 3432974	B2	20030804		
	US 5889352	A	19990330	US 1996-727083	19961008
PRAI	JP 1995-265160	A	19951013		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 09107132	ICM	H01L041-08
	ICS	G01L001-16; H04R017-00
	IPCI	H01L0041-08 [ICM,6]; G01L0001-16 [ICS,6]; H04R0017-00 [ICS,6]
US 5889352	IPCI	H01L0041-08 [ICM,6]
	IPCR	G01L0009-00 [I,A]; G01L0009-00 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H04R0017-00 [I,A]; H04R0017-00 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	310/330.000; 310/324.000
	ECLA	G01L009/00D10; H01L041/09G; H04R017/00

AB The title components comprise (1) a ceramic **substrate** having a spacer plate having ≥1 openings covered and laminated by a covering plate and (2) a piezoelec./**electrostriction** functioning component which is a laminate of a **lower electrode**, the **piezoelec./electrostriction layer**, and an **upper electrode** successively deposited on the outer surface of the covering plate. The components provide sound sensing and

filtering and sound-transmission noise elimination.
ST piezoelec **electrostriction** sound noise sensing filtering
IT **Electrostriction**
Piezoelectricity
Sound detectors
(composite film; piezoelec./**electrostriction** film devices)
IT Noise
(elimination; piezoelec./**electrostriction** film devices)
IT Sound and Ultrasound
(filtering; piezoelec./**electrostriction** film devices)
IT 12626-81-2, Lead titanate zirconate
RL: PRP (Properties)
(piezoelec./**electrostriction** film; piezoelec./ **electrostriction** film devices)

L29 ANSWER 32 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1997:374336 HCAPLUS
DN 127:27621
ED Entered STN: 14 Jun 1997
TI PbZrO3-PbTiO3 piezoelectric thin film device and its manufacture, and ink jet recording head using same device
IN Sumi, Koji
PA Seiko Epson Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01L041-09
ICS B41J002-16; B41J002-045; B41J002-055; C30B029-22; H01L041-187; H01L041-24
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 74
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09092897	A2	19970404	JP 1995-250863	19950928
PRAI	JP 1995-250863		19950928		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 09092897	ICM	H01L041-09
	ICS	B41J002-16; B41J002-045; B41J002-055; C30B029-22; H01L041-187; H01L041-24
	IPCI	H01L0041-09 [ICM,6]; B41J0002-16 [ICS,6]; B41J0002-045 [ICS,6]; B41J0002-055 [ICS,6]; C30B0029-22 [ICS,6]; H01L0041-187 [ICS,6]; H01L0041-24 [ICS,6]
	ECLA	B41J002/14D2

AB In the device comprising a **substrate** successively **coated** with a primer **coating** electrode, and a PbZrO3-PbTiO3 piezoelec. thin film containing Pb(AxBy)O3 (x, y = mol. ratio; x + y = 1) as an additive; concentration of A and/or B is not homogeneous in a depth direction (in a direction from the piezoelec. film to the electrode surface), and shows maximum at an interface between the piezoelec. film and the electrode. The device is manufactured by (1) previously forming a thin film layer of A and/or B on the **electrode**, (2) forming a piezoelec. film, and (3) sintering. An ink jet recording head containing an actuator using the device is claimed. By forming a A-rich or B-rich perovskite-type oxide **layer**, adhesion of the **piezoelec.** film to the electrode is improved.
ST lead zirconate titanate piezoelec device; actuator lead zirconate titanate

piezoelec device; ink jet recording actuator piezoelec device; printing ink jet actuator piezoelec device
IT Ink-jet printers
Piezoelectric actuators
(manufacture of PbZrO3-PbTiO3 piezoelec. device for ink jet recording head actuators)
IT 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in manufacture of PbZrO3-PbTiO3 piezoelec. device for ink jet recording head actuators)
IT 12057-57-7P, Lead magnesium niobium oxide PbMg0.33Nb0.67O3 12060-00-3P, Lead titanate (pbtio3) 12060-01-4P, Lead zirconate (pbzro3) 152633-92-6P, Lead nickel niobium oxide PbNi0.33Nb0.67O3
RL: DEV (Device component use); PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manufacture of PbZrO3-PbTiO3 piezoelec. device for ink jet recording head actuators)
IT 12022-77-4, Iron lead tantalum oxide (FePb2TaO6) 12300-05-9, Lead niobium zinc oxide PbNb0.67Zn0.33O3 12339-43-4, Lead antimony niobium oxide [Pb(Sb1/2Nb1/2)O3] 12439-28-0, Lead yttrium niobium oxide [Pb(Y1/2Nb1/2)O3] 14568-18-4, Lead cadmium tungsten oxide [Pb(Cd1/2W1/2)O3] 14784-14-6, Lead cobalt tungsten oxide [Pb(Co1/2W1/2)O3] 15277-09-5, Lead magnesium tungsten oxide [Pb(Mg1/2W1/2)O3] 15740-30-4, Lead magnesium tellurium oxide [Pb(Mg1/2Te1/2)O3] 38683-39-5, Lead nickel tellurium oxide [Pb(Ni1/2Te1/2)O3] 38683-40-8, Lead manganese tellurium oxide [Pb(Mn1/2Te1/2)O3] 107827-37-2, Cobalt lead niobium oxide Co0.33PbNb0.67O3 159411-03-7, Lead nickel antimony oxide [Pb(Ni1/3Sb2/3)O3] 168170-66-9, Lead manganese antimony oxide [Pb(Mn1/3Sb2/3)O3] 189889-54-1, Cadmium lead niobium oxide (Cd0.33PbNb0.67O3) 189889-55-2, Lead iron neodymium oxide [Pb(Fe1/2Nd1/2)O3] 189889-56-3, Lead chromium neodymium oxide [Pb(Cr1/2Nd1/2)O3] 879998-12-6, Lead manganese niobium oxide (Pb3MnNb2O9)
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(manufacture of PbZrO3-PbTiO3 piezoelec. device for ink jet recording head actuators)

L29 ANSWER 33 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1995:804517 HCAPLUS
DN 123:215833
ED Entered STN: 21 Sep 1995
TI Piezoelectric/**electrostrictive** film element having convex diaphragm portions and its production
IN Takeuchi, Yukihisa; Nanataki, Tsutomu
PA NGK Insulators, Ltd., Japan
SO Eur. Pat. Appl., 19 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H01L041-09
ICS B41J002-045
CC 76-7 (Electric Phenomena)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 667647	A1	19950816	EP 1995-300877	19950213
	R: DE, FR, GB, IT, NL				
	JP 08107238	A2	19960423	JP 1994-241172	19941005

JP 3162584	B2	20010508		
US 5600197	A	19970204	US 1994-365129	19941228
JP 08051241	A2	19960220	JP 1995-12327	19950130
JP 3313531	B2	20020812		
US 6049158	A	20000411	US 1995-385926	19950209
EP 667646	A1	19950816	EP 1995-300876	19950213
EP 667646	B1	19981021		
R: DE, FR, GB, IT, NL				
CN 1129359	A	19960821	CN 1995-115543	19950810
CN 1050229	B	20000308		
CN 1127430	A	19960724	CN 1995-115342	19950811
CN 1050008	B	20000301		
US 5774961	A	19980707	US 1996-694280	19960808
US 6108880	A	20000829	US 1998-175405	19981020
PRAI JP 1994-17697	A	19940214		
JP 1994-24174	A	19940222		
JP 1994-122732	A	19940603		
JP 1994-189203	A	19940811		
JP 1994-241172	A	19941005		
US 1994-365129	A3	19941228		
US 1995-385926	A3	19950209		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 667647	ICM	H01L041-09
	ICS	B41J002-045
	IPCI	H01L0041-09 [ICM,6]; B41J0002-045 [ICS,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	ECLA	B41J002/16D2; H01L041/09G
JP 08107238	IPCI	H01L0041-08 [ICM,6]; H01L0029-84 [ICS,6]; H01L0029-66 [ICS,6,C*]; H01L0041-22 [ICS,6]; H04R0017-00 [ICS,6]
US 5600197	IPCI	H01L0041-08 [ICM,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	310/328.000; 310/324.000
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
JP 08051241	IPCI	H01L0041-09 [ICM,6]; H01L0041-22 [ICS,6]; H02N0002-00 [ICS,6]
US 6049158	IPCI	H01L0041-08 [ICM,7]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	310/328.000; 310/324.000
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
EP 667646	IPCI	H01L0041-09 [ICM,6]; H01L0041-24 [ICS,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
CN 1129359	IPCI	H01L0041-083 [ICM,6]; H01L0041-22 [ICS,6]
	IPCR	H04R0017-04 [N,C*]; H04R0017-08 [N,A]
CN 1127430	IPCI	H01L0041-09 [ICM,6]; H01L0041-107 [ICS,6]; H01L0041-113 [ICS,6]; H01L0041-24 [ICS,6]

	IPCR	H04R0017-04 [N,C*]; H04R0017-08 [N,A]
US 5774961	IPCI	H01L0041-22 [ICM,6]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	029/025.350; 310/328.000
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24
US 6108880	IPCI	H01L0041-22 [ICM,7]
	IPCR	B41J0002-16 [I,A]; B41J0002-16 [I,C*]; H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-24 [I,A]; H01L0041-24 [I,C*]; H04R0017-04 [N,C*]; H04R0017-08 [N,A]
	NCL	029/025.350; 310/324.000; 310/330.000; 310/358.000
	ECLA	B41J002/16D2; H01L041/09G; H01L041/24

AB A piezoelec./**electrostrictive** film element includes a ceramic **substrate** having ≥1 window and a diaphragm portion for closing each window, and a film-like piezoelec./**electrostrictive** unit formed on the diaphragm portion. The diaphragm portion has a convex shape and protrudes away from the corresponding window. The piezoelec./ **electrostrictive** unit includes a **lower electrode** , a **piezoelec./electrostrictive layer**, and an **upper electrode**, which are formed on the convex outer surface of the diaphragm portion by a film-forming method.

ST piezoelec **electrostrictive** film element convex diaphragm

IT Ceramic materials and wares
  Electrostriction
  Membranes
    (piezoelec./**electrostrictive** film element having convex diaphragm portions and production)

IT Electric apparatus
    (piezo-, piezoelec./**electrostrictive** film element having convex diaphragm portions and production)

IT 7440-47-3, Chromium, processes 7440-50-8, Copper, processes 12060-00-3, Lead titanate 12060-01-4, Lead zirconate 37349-19-2, Lead magnesium niobate
  RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
    (production of piezoelec./**electrostrictive** film elements containing)

IT 1314-23-4, Zirconium oxide (ZrO_2), processes
  RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
    (production of piezoelec./**electrostrictive** film elements containing yttria-stabilized)

IT 1314-36-9, Yttrium oxide (Y_2O_3), processes
  RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
    (production of piezoelec./**electrostrictive** film elements containing zirconia stabilized with)

L29 ANSWER 34 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1994:122776 HCAPLUS
DN 120:122776
ED Entered STN: 05 Mar 1994
TI Device having an auxiliary **electrode between piezoelectric/ electrostrictive layer** and **substrate**
IN Takeuchi, Yukihisa; Kimura, Koji
PA NGK Insulators, Ltd., Japan
SO Eur. Pat. Appl., 12 pp.

CODEN: EPXXDW
DT Patent
LA English
IC ICM H01L041-04
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 561616	A2	19930922	EP 1993-301997	19930316
	EP 561616	A3	19950419		
	EP 561616	B1	19970604		
	R: DE, FR, GB, IT				
	JP 05267742	A2	19931015	JP 1992-91849	19920317
	US 5281888	A	19940125	US 1993-30535	19930312
PRAI	JP 1992-91849	A	19920317		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 561616	ICM	H01L041-04
	IPCI	H01L0041-04 [ICM,5]; H01L0041-00 [ICM,5,C*]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	ECLA	H01L041/09G; H01L041/22D
JP 05267742	IPCI	H01L0041-09 [ICM,5]; H01L0041-18 [ICS,5]; H03H0009-24 [ICS,5]; H03H0009-00 [ICS,5,C*]
US 5281888	IPCI	H01L0041-08 [ICM,5]
	IPCR	H01L0041-09 [I,A]; H01L0041-09 [I,C*]; H01L0041-22 [I,A]; H01L0041-22 [I,C*]
	NCL	310/366.000; 310/358.000; 310/363.000; 310/365.000

AB A piezoelec./**electrostrictive** device includes a ceramic **substrate** formed principally of partially or fully stabilized zirconia; a **lower electrode** formed on the ceramic **substrate**; a **piezoelec./ electrostrictive layer** formed on the **lower electrode**; and an **upper electrode** formed on the **piezoelec./ electrostrictive layer.** The device further includes an auxiliary electrode formed on the ceramic **substrate**, apart from the **lower electrode**, such that a portion of the auxiliary **electrode** is located **between** the **piezoelec./ electrostrictive layer** and the ceramic **substrate.** The auxiliary electrode is formed of an elec. conductive material which permits sufficiently good adhesion to the ceramic **substrate** and the **piezoelec./ electrostrictive layer.** The **upper electrode** extends **between** and is elec. connected to the **piezoelec./electrostrictive layer** and the auxiliary electrode.

ST **piezoelec electrostrictive layer** auxiliary electrode device

IT **Electrostriction**
(piezoelec. devices having, auxiliary electrode for)

IT **Electrodes**
(auxiliary, **between piezoelec.** and **electrostrictive layers**)

IT 12060-00-3, Lead titanate 12060-01-4, Lead zirconate 37349-19-2, Lead magnesium niobate
RL: TEM (Technical or engineered material use); USES (Uses)
(piezoelec./**electrostrictive** material containing, for devices having auxiliary electrodes)

IT 1314-23-4, Zirconia, uses
RL: USES (Uses)
(**substrate**, stabilized, for piezoelec./ **electrostrictive** device)
IT 1305-78-8, Calcium oxide, uses 1309-48-4, Magnesium oxide, uses 1314-36-9, Yttrium oxide, uses 11129-18-3, Cerium oxide 12651-43-3, Ytterbium oxide
RL: DEV (Device component use); USES (Uses)
(zirconia stabilized by, for piezoelec./**electrostrictive** devices)

L29 ANSWER 35 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1992:226332 HCAPLUS
DN 116:226332
ED Entered STN: 31 May 1992
TI Laminate piezoelectric actuator element
IN Takahashi, Yoshikazu; Suzuki, Masahiko; Takeuchi, Makoto
PA Brother Kogyo K. K., Japan
SO U.S., 12 pp.
CODEN: USXXAM
DT Patent
LA English
IC H01L041-08
INCL 310328000
CC 76-7 (Electric Phenomena)
Section cross-reference(s): 57, 74
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5089739	A	19920218	US 1991-669982	19910315
	JP 03270085	A2	19911202	JP 1990-69504	19900319
	JP 04133482	A2	19920507	JP 1990-256083	19900926
	JP 04167580	A2	19920615	JP 1990-294582	19901031
PRAI	JP 1990-69504	A	19900319		
	JP 1990-227635	A	19900828		
	JP 1990-256083	A	19900926		
	JP 1990-294582	A	19901031		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5089739	IC	H01L041-08
	INCL	310328000
	IPCI	H01L0041-08
	IPCR	B41J0002-27 [I,C*]; B41J0002-295 [I,A]; H01L0041-083 [I,A]; H01L0041-083 [I,C*]
	NCL	310/328.000
JP 03270085	IPCI	H01L0041-09 [ICM,5]
JP 04133482	IPCI	H01L0041-09 [ICM,5]
JP 04167580	IPCI	H01L0041-09 [ICM,5]

AB The element comprises plural laminated piezoelec. subunits, each of which comprises **piezoelec.** ceramic **layers** for generating longitudinal **electrostrictive** strain with a voltage, internal electrodes for applying the voltage to the **piezoelec.** ceramic **layers**, and **piezoelec.** inactive portions which correspond to parts of the **piezoelec.** ceramic **layers** having no internal electrodes laminated thereon. The **piezoelec.** ceramic **layers** and the internal electrodes are alternatively laminated on each other to form a piezoelec. subunit. An adhesive member having an attaching area equal to or smaller than an area of each internal **electrode** is provided **between** the neighboring piezoelec.

subunits to thereby attach and assemble the plural piezoelec. subunits to form the piezoelec. actuator element and form slit portions between the laminated piezoelec. subunits in such a manner as to surround the adhesive member. The piezoelec. actuator element further includes external electrodes provided at both sides thereof in such a manner as to be connected to the internal electrodes to apply the voltage to the internal electrodes. Application of the actuator element for printers is indicated.

ST printer laminate piezoelec actuator
IT **Epoxy** resins, uses
RL: USES (Uses)
(in laminate piezoelec. actuators)
IT Printing apparatus
(laminate piezoelec. actuators)
IT **Electrostriction**
(laminate piezoelec. actuators with)
IT Actuators
(piezoelec., laminates)
IT 12626-81-2, Lead titanium zirconium oxide (Pb(Ti,Zr)O3)
RL: USES (Uses)
(laminate piezoelec. actuator containing)

L29 ANSWER 36 OF 37 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1993:549581 HCAPLUS
DN 119:149581
ED Entered STN: 02 Oct 1993
TI Active device and liquid crystal display using same
IN Komatsu, Hiroshi
PA Sanyo Electric Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM G02F001-1343
ICS G02F001-1333; G02F001-1335; G02F001-136
CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 04331919	A2	19921119	JP 1991-101327	19910507
PRAI	JP 1991-101327		19910507		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 04331919	ICM	G02F001-1343
	ICS	G02F001-1333; G02F001-1335; G02F001-136
	IPCI	G02F0001-1343 [ICM,5]; G02F0001-1333 [ICS,5]; G02F0001-1335 [ICS,5]; G02F0001-136 [ICS,5]; G02F0001-13 [ICS,5,C*]

AB The title device is provided in order on an insulative **substrate** a **polymer** layer, a 1st electrode, a ferroelec. layer comprising a **vinylidene** fluoride-trifluoroethylene copolymer, and a 2nd electrode. The **polymer** layer such as a PMMA layer formed on the insulative **substrate** eases the stress caused by the vibration produced by the **piezoelectricity** of the ferroelec. **layer** and prevents the peeling **between** the 1st **electrode** and ferroelec. layer with the passage of time. The title display has an active **substrate** having at least the above active device in which the color filter layer comprises the **polymer** layer. The

construction of the display having the active **substrate** reduces the manufacturing cost of the display.
ST active device stress relaxation **polymer** layer; liq crystal display active device
IT Optical imaging devices
(electrooptical liquid-crystal, containing **polymer** layers for easing stress)
IT 28960-88-5, **Vinylidene** fluoride-trifluoroethylene copolymer
RL: USES (Uses)
(ferroelec. active device having layer of, **polymer** layer for easing stress from)
IT 9011-14-7, PMMA
RL: USES (Uses)
(ferroelec. layer-containing active device having layer of, for easing stress)

L29 ANSWER 37 OF 37 INSPEC (C) 2006 IET on STN
AN 1988:3122902 INSPEC DN A1988-063479
TI The effect of electrode stiffness on the piezoelectric and elastic constants of a piezoelectric bar
AU Moffett, M.B.; (Naval Underwater Syst. Center, New London Lab., CT, USA), Ricketts, D.; Butler, J.L.
SO Journal of the Acoustical Society of America (Feb. 1988), vol.83, no.2, p. 805-11, 29 refs.
CODEN: JASMAN, ISSN: 0001-4966
Price: 0001-4966/88/020805-07$00.80
DT Journal
TC Theoretical
CY United States
LA English
AB Electrodes that are stiff and thick compared with the underlying piezoelectric **substrate** material can substantially change the effective piezoelectric and elastic constants from those values that would be obtained in the absence of electrodes. A simple analytical model for the stress distribution inside a composite piezoelectric bar, consisting of **two** outer **electrode layers** and one inner **piezoelectric layer**, is used to calculate the effective g31, g32, g33, and gh piezoelectric constants, as well as the effective sij (i, j=1, 2, 3) elastic compliance coefficients. Numerical results for copper-clad, voided poly(**vinylidene** fluoride) (PVDF) sheets are presented
CC A4388 Transduction; devices for the generation and reproduction of sound; A6220D Elasticity, elastic constants; A7760 Piezoelectricity and electrostriction
CT elastic constants; piezoelectricity
ST electrode stiffness; elastic constants; piezoelectric bar; substrate; PVDF

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